THE BUILDER

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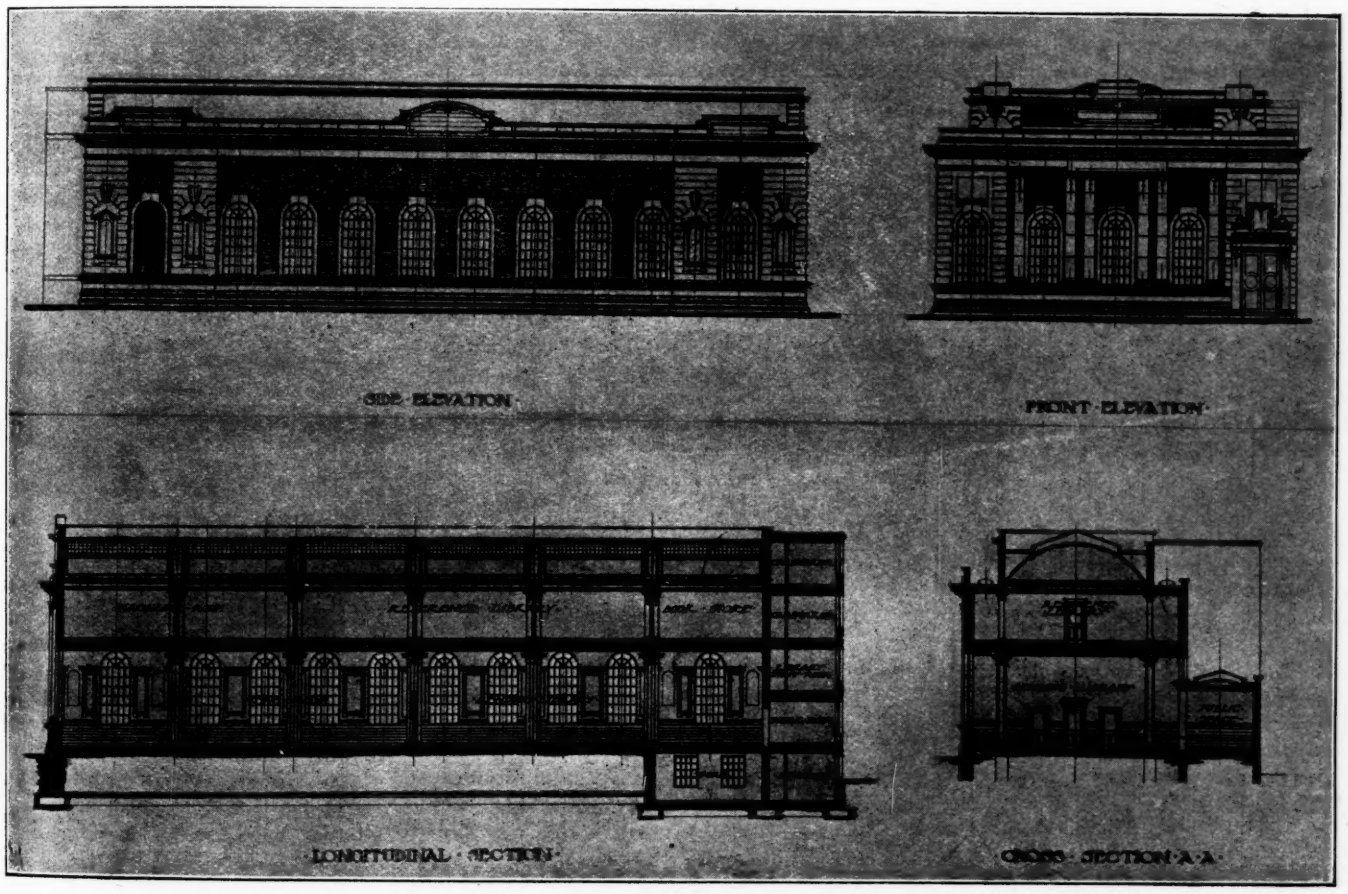


Deptford Library Competition: First Premiated Design, by Sir A. Brumwell Thomas. (*See page* 156.)

EVIDENCE IN PRIVATE BILLS.

PARLIAMENT having now laid down the general principle that in future all Private Bills must show a proper consideration for any æsthetic questions involved, and must be prepared by and with the advice of qualified experts, it is time that the procedure of the Select Committees should be so altered and improved as to give effect to the will of the nation.

If we consider this ruling in conjunction with the emphasis laid on the value of the amenites of our cities in the Town Planning Act we are encouraged to assume that the national conscience is at last fully awakened to the enormity of our previous methods, and that we have at length realised that material prosperity is not the ultimate end of life, or even of the conduct of public affairs, or the practical satisfaction of material necessities the only object of our public improvements.

Interpreting this principle in the widest sense, we are justified in saying that it should not apply only to bridges over the Thames, but to all constructive and engineering work throughout the country, not only bridges, but railways, docks, canals, and harbours—in fact, to every class of work of whatever description that affects the amenities of the town or alters the face of the country-side.

The difficulty is that when a Private Bill comes before a Select Committee there is no one to say whether or not it involves æsthetic questions. When we think of some of the so-called improvements perpetrated in the past we are quite prepared to believe that a Select Committee approved them without ever realising that any artistic questions were involved; and even now we could almost believe it to be possible, for we are not aware that there is any competent authority whose duty it is to say whether a Bill does or does not affect them. Neither are we aware that any machinery exists to ensure that where such questions

are affected they shall receive adequate consideration.

Possibly it might be better to withdraw all Bills affecting artistic questions from the Select Committees and deal with them otherwise, but while the present method obtains the procedure should at least be more suitable to the nature of the matters to be discussed.

The extraordinary thing is that, although their interests may be vitally affected, the general public can do nothing. They have no standing and no right to protest. The proposals before the Committee may prejudice public interests, but, unless they also prejudice private interests, it seems to be left to the chance that some public-spirited society may happen to notice what is going on, and be willing to be heavily penalised for presuming to be so public-spirited as to oppose it in the interests of the general welfare of the State. Even then it seems that they have no legal right to appear, but must obtain the permission of the Committee and the gracious consent of the promoters, who have a right to object to their appearance. Surely such matters should not be left to chance; recognised opposition seems as necessary here as in the House itself.

At present the procedure seems all in favour of the promoters—whether their proposals are good or bad. If anyone whose personal interests are affected opposes the scheme his opposition is discounted as being prompted solely by a selfish regard for his own interests. If any one who, having special knowledge of the subject and no personal interest to serve, might be credited with a disinterested regard for the public welfare, ventures to say a word he is promptly told to mind his own business. If he does get in a word of protest it is by favour of the Committee, and not by right. In either event the promoters score. Given a sufficiently wealthy Corporation and anything may go through.

We could well imagine that this procedure might be a relic of the days when influential capitalists were able to influence the procedure of Parliament to suit their own interests and not those of the public, but it seems rather out-of-date in these democratic days.

When the subject under discussion is of an ordinary business nature, with which the ordinary business man is competent to deal, it might with justice be contended that the members of the Committee are there to represent the public and to protect the interests of the State; but even if they could always be trusted immediately to grasp the full significance and effect of a scheme with which they were not previously acquainted, and to discover for themselves the many aspects of the case deliberately withheld from their notice by the promoters, they would not be competent to protect the interests of the public, where architectural and other artistic questions were concerned, unless they happened to be artists themselves.

If, realising their own limitations, they admit the value of expert evidence, they should also realise that the case for the promoters is only one side of the question. If this is supported by expert evidence the interests of the State may demand that equally competent evidence be called in support of the other. There is never any harm in hearing both sides of a question.

THE ARCHITECT AS BUILDER.

THE more recent developments in the organisation of garden suburbs have included one that has aroused a marked interest among architects and others. The fact that this interest has taken the form of criticism, in some cases favourable, but in others most definitely adverse, does not in our view prove it to be undesirable that the experiment in question should have been made; indeed, we are inclined to think that it must have been of considerable value in many cases in bringing home to many a young architect a number of practical considerations, unconnected with the art of architecture, but very germane to the execution of building work. The exhibition at Gidea Park and others of a similar character have admittedly been more or less experimental, and, while both from the architectural and the commercial standpoint some defects have become apparent, yet the knowledge gained may be held to have justified the experiment.

The promoters seem to have clearly indicated the terms that they were prepared to offer. These were evidently intended to be fair and reasonable, and, if a competitor thought not, he was in no way compelled to take part. The conditions appear to have been closely adhered to throughout, and on the business side we cannot see that any case has been made out against the promoters. Of course, we must recognise the regrettable case in which a young and struggling architect may have been tempted into taking up financial responsibilities for which he is unfitted, and which may distract him from his legitimate avocation, but, on the other hand, there are others to whom such a competition must have given a lead as to the direction in which they can be of most service to the public.

As a general rule, however, it is certainly not in the best interests of architecture that it should be combined with financial speculation, though there are a limited number who can work usefully on these lines. This being the case, we think that any future schemes for improving the architecture of our suburbs should keep quite distinct the questions of design and of building. There are many ways of doing this, and not only will such a division, which is but the one generally recognised as expedient, avoid the objections that have been pointed out, but it will result in a far superior architectural treatment for such an estate.

The weak point in the garden city and garden suburb is the "bitty" and confused effect resulting from the multiplicity of ideas packed into a limited space. However careful the arrangement, when we see in a road some 200 yds. long the work of some twenty architects, each of whose designs was prepared without any knowledge of what the others were doing, there is bound to be too great a variety of treatment and consequent confusion in the *ensemble*.

If prizes were offered for designs only, then the successful competitors can be allotted, not a scanty 40-ft. or 50-ft. plot, but an area sufficient for a group of houses harmoniously arranged. The building should be done by the estate; or if this is, for financial reasons, impracticable, the promoters are surely in as good a position to arrange for builders to take up the ground as is the individual architect. At Gidea Park some of the estate is being dealt with in this manner, and this portion compares favourably with that devoted to the exhibition, simply because of the advantage gained by designing a group of houses on uniform lines, over the more or less haphazard juxtaposition of specimen cottages.

Thus we find two drawbacks to the method of making the architect his own builder—one the personal influence on the architect as an artist, and the other the effect on the architectural character of the estate owing to the compression of too many ideas into too small an area. Taking both these into consideration, we think that promoters will be wiser in future if they rely on the older method of obtaining their architecture and their financial support from distinct sources.

We would not discount the value of the experiments that have been made, as we cannot but feel that without them we should not have been able to realise many of the possibilities before us in suburban developments. Probably most of the architects who have taken part in them have gained valuable information at not too costly a rate; but experiments are useless unless they add to our stock of knowledge, and we may anticipate that future ones will take a somewhat different form.

NOTES.

Hyde Park Corner for King Edward VII.

WE are very pleased to find such a general consensus of public opinion in favour of Professor Adshead's plan for the memorial to King Edward VII. published in our columns last week. It has been placed before a number of Members of Parliament and their opinion is almost unanimously in favour of this site in preference to that at present approved by the Committee. This Committee will be asked to consider the new proposal, and we cannot but feel that they will be impressed by its many advantages. Among these it may be mentioned that it is in as close a relationship to Buckingham Palace as either of the previous sites, and is on that ground likely to meet with the King's approval, while its detachment from the Victoria Memorial gives it an independent value of its own instead of rendering it merely a kind of annex to that scheme, such as it would have been in both the first site selected and the one at present officially supported by the Committee.

The Traffic Question.

WHILE the question of a memorial should be decided solely on the grounds of its expressing artistically the attributes of the individual commemorated and should not be mixed up with

the fulfilment of practical demands, only a pedant would object, if it can be shown that these first requirements are adequately met, if other gains can be claimed in addition. Now Professor Adshead's scheme, as well as providing a fine site for the monument, very greatly improves the possibilities for traffic control at this point. Since the time of last "improvement" at Hyde Park Corner, we have grasped the disadvantages and risks of large open spaces intersected by numerous traffic routes, of which this is a typical example. We now know them to be dangerous to the pedestrian, and costly in the amount of direction demanded for the traffic. Any scheme more in accord with our present knowledge of traffic requirements may certainly claim this as an added merit.

The Greater London Railway.

WE cannot think that in rejecting the Greater London railway scheme, the Committee of the House of Lords has acted in the best interests of our great city. Though at the present time the scheme may be a little in advance of the requirements, it will in the near future become impossible to carry out on account of the enhanced value of the land it would require to schedule. It possesses many points of similarity to the railway portion of the scheme propounded by Mr. D. Barclay Niven, and supported by Mr. G. L. Pepler in a carefully reasoned paper read before the Town Planning Conference last October. The general merits of such a scheme are obvious, and we must naturally feel some regret in seeing the rejection of any proposal that might lead to its adoption, if only in part. We do not believe that we have heard the last of the Greater London Railway, and we should not be surprised to find the proposal revived. Might we hint to the promoters that if their scheme provided for an outer boulevard, and other amenities, it should carry with it a force of public support that no Parliamentary Committee could resist?

The Citadel of Aleppo.

IN a letter to the *Times*, Mr. H. Pirie-Gordon draws attention to the shameful neglect of the historic monuments in Asia Minor and the supine attitude of the Government at Constantinople towards these. In Urfa the Byzantine walls are in process of being destroyed; at Beredjik, a similar destruction is taking place; and now it has been publicly announced that the Castle of Aleppo is to be levelled, and the stones sold as building material. It is almost inconceivable in these days that such a piece of vandalism should be attempted. Aleppo, without the castle on its citadel hill, will lose all claim to distinction; one might almost as well talk of levelling the Acropolis by way of improving Athens. The extent to which Aleppo depends on this citadel group for its effect may be appreciated by any who have at hand "Amurath to Amurath," by Gertrude Lothian Bell.

The Architect's Judicial Position.

A CASE recently decided in the Courts, in the course of which it was alleged that an architect had, by special request or instruction from his client, withheld a certificate due to the builder, led to a judicial pronouncement which cannot fail to be of service to the profession. Some clients seem to think that an architect can be retained, like an attorney, to exact the last pound of flesh from the builder, and to strain the authority vested in him by the contract in the owner's interest to the utmost extent that legal technicalities will permit. On the contrary, the judges laid it down that the position of the architect, as between client and contractor, is an impartial and judicial one. We think this fact cannot be emphasised too often, and that its recognition by the courts cannot fail to be specially helpful to young architects. Being naturally anxious to build up a practice by pleasing their clients, they may find it rather difficult at times to hold their own with influential people, who may be disposed to be overbearing.

THE STORY OF THE BRIDGE.

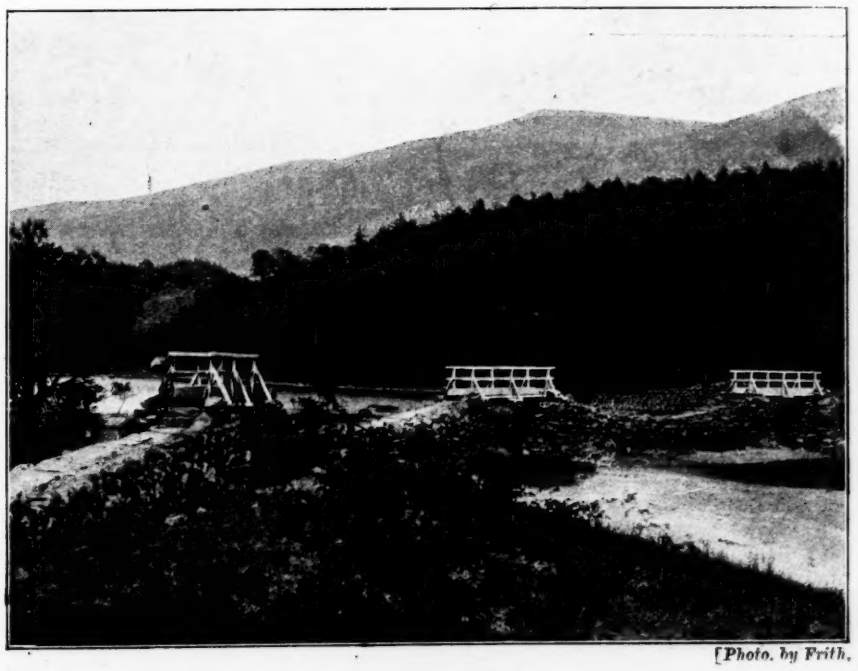
By WALTER SHAW SPARROW.

I.—PRIMITIVE BRIDGES.

IT is reasonable to suppose that prehistoric man owed his first timber bridge to a storm of wind, which hurled down a tall tree across a wide crevasse in a glacier of the Ice Age. Many a bridge of this accidental sort was probably used long before the period of the cavemen, during those mysterious times when a type of ape, growing tired of its own active life on all-fours, passed through its evolution from monkeyhood into manhood, leaving a great many of its kith and kin either stranded for ever at the halfway stations of gorillahood and chimpanzeeism, or hopelessly in the rear as little and agile tree-climbers. As man seems to have had for his first ancestors a breed of apes born with a taste for experiment and discontent, it is not surprising to find that the earliest human efforts to pass from bad to better took hints from Nature and her marvels. Cave-lions and cave-bears were compelled to give up their homes to man; the fire stored in flint was discovered when the first human weapons were chipped to a point; clay was moulded into utensils, and the building methods of birds and beasts were patterns for imitation. We know, for instance, that man dug round pit-dwellings into which he crawled on his stomach along a circular burrow, finding warmth and safety in the earth like many other animals. Later, encouraged by the example set by beavers in their dams and lodges, human craftsmanship evolved the lake-dwelling and the round hut, using for the timber walls the same plaster of mud mixed with straw and loam that house martins have ever employed in their nest-building.

Well now, as soon as man had passed through that technical evolution to which he owed the solid foundation of his lake-homes he was a primitive architect, with knowledge enough to build a bridge of timber; and if we keep in mind the way in which he laid enduring foundations in a lake we may infer, without any great extravagance, that his wooden bridges were akin to those at Srínagar, the capital of Kishmír, a city founded in the VIth century A.D., and justly famous for the quaint youth of its unchanging architecture. Seven bridges there span the River Jhelum, which is the Hydaspes of the Greek historians, and to study their construction is to feel oneself intimately in touch with a little Venice belonging to the long ago of primeval handicrafts. I give two photographs, and as each represents a bridge having a superstructure of frail shops, partly held up by poles, the probable resemblance to a lake-village is plain for us to see. The piers are made of beams laid criss-cross, and in one bridge there is no angular platform below the piers to break the force of the current after heavy rains, while the pier timbers in the other rest on foundations similar in shape to those that Colechurch and Isembert designed and made for the great Old London Bridge, with its romantic houses, its chapel, its defensive towers, and cellars in the thickness of the piers. Old London Bridge, finished in 1209, and destroyed in 1830-31, had the same lineage as the shop-bridges of Srínagar, the first ancestors being prehistoric huts built over lakes on artificial islands formed of logs, brushwood and peat, with upper layers of timber, and branches held in position by scores of little piles.

But, although the workmanship at Srínagar is very primitive, you will see that the piers have been influenced by the progress of art in India, for the horizontal beams, cut in varying lengths, are composed, and they suggest a rude arch between the piers. This evidence of progress, too, is more noteworthy in another bridge at Srínagar, a bridge of unmortared stone, with booths of timber, over the Marqual Canal. Here the arch is nearly triangular, suggesting a descent from that cone-shaped hut from which the beehive houses of stone inherited the inclined jambs to their doorways.



[*Photo. by Frith.*

Thirlmere Bridges.

The bridges at Srínagar, again, are not all burdened with houses. Some have nothing more than a narrow footway of boards and parapets of simple latticework. A very attractive example, with six piers, crosses the Jhelum at Baramula, and beyond, but near to it, a primeval-looking village basks in the shade of the Himalaya Mountains. Here, if anywhere, we have a type of bridge similar to the prehistoric—if, as certainly seems probable, the art of the lake-dwellers left its sheltered moorings and adventured across rivers.

India is rich in primitive bridges, and I have now to speak of the suspension bridges of bamboo, near Darjeeling, for instance, and also in the Bermulda Hills. Here, in the Buria Kol, bridge-ropes are made with the glossy and silky fibres of the Nilgiri nettle. As to the general look of the handicraft, it is like human spider-webbing, and its effective simplicity and strength ought to lessen the busy pride that engineers now take in metal suspension bridges having often a prodigal ungainliness.

Thus far we have taken a rapid glance at primitive work in wood and in cane. To this part of our subject several Roman bridges belong. The earliest bridge built at Rome was called the Bridge of Stakes, Pons Sublicius, built, it is said, by Ancus Martius, then reconstructed by the high priests, who thereupon became known as "Pontifices." An illustration of the Pons Sublicius, adapted from historical descriptions, will be found in Colonel Emy's *Traité de l'Art de la Charpenterie*. The piles were driven into the river's bed, then straightened at the top with strong wind-braces; hurdle-like piers were formed in this way for the superstructure, which had latticed parapets. On this bridge Horatius Cocles passed for all time into the heroisms that beget their like.

The Pons Sublicius is believed to be the form of bridge that the Romans used frequently in their colonies, and this belief is reasonable, particularly as regards England, for England was a land of forests, and if the Romans had built important bridges of stone some relics of them would have been found in our larger rivers. Timber bridges, too, belong to the traditions of English workmanship, and a good many of them were stake-and-pile bridges. There was one at Windsor in the XVIIIth century, and its primitive craftsmanship contrasted oddly with the Castle. Artists liked to draw it, and I have seen it in a picture by Joseph Farington, R.A., who lived from 1747 to 1821. Twenty years ago a very picturesque bridge of stakes kept the past alive at Old Shoreham, Sussex, but a recent illustration in Mr. F. G. Brabant's "Sussex" shows that it has been made as dull as grammar at a wedding breakfast. Even so, its lineage is very ancient; there was a lawsuit about the bridge in the sixth year of Edward II., and it was then so old that a part of the woodwork had fallen into the river. And I dwell upon these matters here because the Old Shoreham Bridge of twenty years ago showed no more art in its construction than that which went to the making of a prehistoric lake-village.

But we turn now to another point. How were stone bridges evolved? This question belongs to the domain of speculative reasoning, but we can start out from definite facts. It is safe to believe that primitive man must have used the stepping-stones across rivers that the hazards of Nature often placed in the waters. This was the earliest bridge of stones, but its value to man not only varied from day to day, but was of no use at all when it was needed particularly—that is to say, after heavy rains, when rivers became too rapid or too deep to be forded on foot. Primitive man could not fail to notice this fact, and would he not apply to it his ripening intelligence as a builder? Each stepping-stone was a foundation for other stones to rest upon, and a cluster of them, carried up to a given height above the surface of the river during a flood, would form a pier, across which logs or slabs of stone could be laid to another pier, just as they are to-day in the Pont-y-Pant, in the Lledr Valley, Wales.

One remembers, in this connexion, that a famous bridge at Babylon, over the Euphrates, mentioned by Herodotus and Diodorus Siculus, had stone piers and a footway of movable planks, which were not left down at night. This bridge is ascribed by Herodotus to Nitocris, and by Siculus to Semiramis. It was easy to defend, and this good quality gave a long life to its central idea. A mediæval bridge with movable planking still exists in France. I have seen a photograph of it, but forget the name.

Very often the Romans used stone piers and a superstructure of wood, as in Trajan's magnificent bridge across the Danube, just below the rapids of the Iron Gate. This great achievement, dating from A.D. 104, and designed by Appollodorus of Damascus, was partly destroyed by Hadrian, who said that it made a passage along which the natives could make raids to the injury of the Roman rule; as if a system of barriers and guards could not have held the great footway against all comers. Still, relics of thirteen piers remain to this day. Originally the bridge was about 1,300 yds. long, with twenty arches of hewn stone, which, according to Dion Cassius, were 150 ft. high, 60 ft. wide, and 170 ft. from each other. Here we have travelled far from the Pons Sublicius and the primitive bridge of planks or of stone slabs resting on stones. It is believed that in Trajan's bridge the piers were founded by sinking caissons, while during the building of the piers for the Babylon Bridge the Euphrates was diverted from its course. This happened also to the Thames when Old London Bridge was constructed, according to Stow.

Finally, which is the earliest type of stone bridge in Great Britain? If stepping-stones were ever developed into piers of loose boulders, we must expect to find some tradition of it in those parts of the country where descendants of the prehistoric inhabitants sheltered themselves from successive invasions. Ethnologists are now pretty well agreed that there are people in the British Isles whose lineage is probably as old as the Neolithic folk of England. They are dark, short, virile, and oval-headed; their features are small and their tempers quick; they are to be met with in Cornwall, Wales, the Isle of Man, Ireland, and the West of Scotland, as far north as the Orkneys. Well now, it is from Dartmoor that I choose for illustration a very primitive bridge made with granite slabs resting on granite piers. It stands at Postbridge on the East Dart. Locally it is called a "clapper" bridge, and its type is common in Cornwall. One is reminded at once of Stonehenge.

This does not mean that the "clapper" bridges still extant belong to pre-Roman times. They are mediæval, but the principle of their structure is prehistoric. The same type, but with variations, is found also in Wales, and I note particularly the Pont-y-Pant, in the Lledr Valley, for its piers are loose fragments of rock, and the wooden footway is primitively rustic. Here is a bridge that belongs to what I venture to call the period of developed stepping-stones. Among my illustrations is a good English example of primitiveness, at Thirlmere. In this quaint thing the stones form a sort of dam with angular holes in it, across which run wooden hand-bridges. Imagine how easy it would be in a shallow river to convert stepping-stones into a bridge of this kind, leaving a space here and there for the water to pass through.

[*Photo. by C. S. Sargisson.*

The Weaver's Bridge, Wycollar.

DEPTFORD LIBRARY COMPETITION.

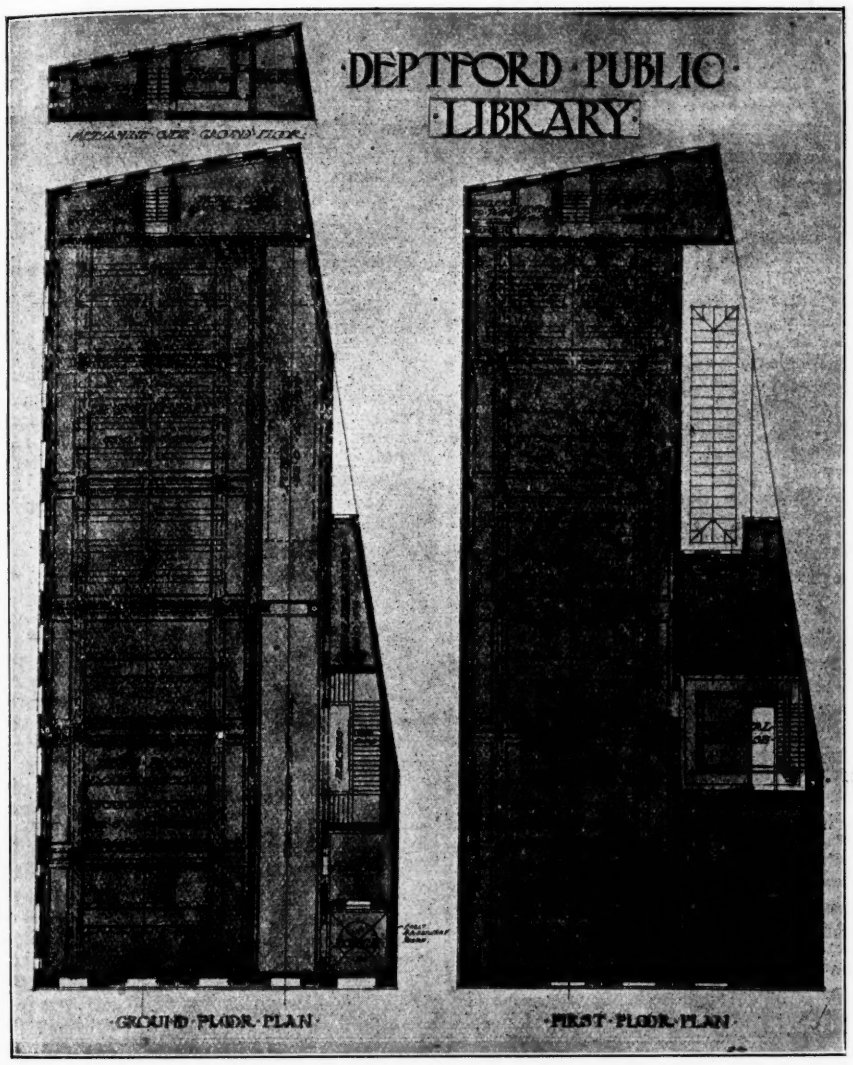
THE site provided for this building is perhaps as good as could be expected. An island site is, of course, necessary to a perfect architectural rendering of the programme, but, where one with three frontages is provided, we are bound to recognise how much worse it might have been, and to be grateful accordingly.

The chief trouble with the site is that it faces the wrong way. It is rather long and narrow for a library, and its shorter side faces the main street. This leads to difficulties with the entrance. Considering the shape of the site, the natural place for the entrance is perhaps in the centre of the longer frontage to the side street; but from the point of view of approach it should be in the shorter frontage to the main road.

In the circumstances the competitors seem to have been in considerable doubt as to the course to pursue. The majority, including the author of the first premiated design, Sir A. Brumwell Thomas, and of the second, Messrs. Castle & Warren, place the front entrance at the narrow end of the site in the main street, while the author of the third premiated design, Mr. Henry T. Hare, was evidently so keenly alive to the advantages of both positions as to send in two complete designs. Others again, such as Mr. S. B. Russell, and Messrs. North & Robin, make out a very good case for placing the entrance at the side.

When a premium is awarded to a competitor who has submitted two complete schemes it would always be interesting to know to which the premium is given. In this case, we presume, it is to the one with the entrance in the same position as those placed first and second, but in other cases it might not be so obvious.

If we accept the point of view that the entrance direct from the main street is of the



First Premiated Design, by Sir A. Brumwell Thomas.

first importance, we find that the frontage is too narrow to admit of a central entrance. This has led to the entrance being placed on the side nearest the adjoining buildings, and the result is a type of plan that is more characteristic of a town house than a public library. The entrance corridor with staircase is taken straight through the depth of the news-room, which has its narrow end to the front, and is lit from front and side, and leads direct to a large room at the back—the lending library—the whole width of the site, which is lit from the side street, as behind it again is a block of staff rooms and stores lit from the back street.

This at once leads to difficulties with the sub-librarian's room, which cannot be both conveniently situated and properly lit, and with the lighting of the corridor, and the public space and counter of the lending library. To obtain light from the windows of the side street between the rows of stacks, the counter has had to be placed on the opposite side of the room where there is no light for the indicators. To obtain this light the public space is top lit, which involves the main wall of the reference library on the first floors being set back over the counter and carried over a space of some 60 ft. Practically the only one of the competitors on these lines who has been able to avoid this structural and æsthetic defect is Mr. Maurice B. Adams, who solves the problem by boldly lighting both his ground and first floors from the garden of the adjoining property. Assuming that this expedient is allowable by the terms of the conditions, it has, of course, the added advantage of giving more room on the first floor.

The winning design by Sir A. Brumwell Thomas has achieved an apparent simplicity and straightforwardness of plan which probably went far to gain him the award. In order to obtain such desirable simplicity it may, of course, be necessary to make some sacrifice of accommodation and convenience of arrangement. It is, however, just a question whether in this case the process has not been carried too far, unduly cramping the staff and store rooms at the back—the book store being reduced by nearly one-half its area—crowding out the librarian's room from its most convenient position and placing it where it would be more suitable for a public room, and crushing the sub-librarian into a distorted apology for a room on the wrong side of the entrance corridor. Everything goes to the wall for the sake of a straight line—especially the sub-librarian. It is just possible that in revising this scheme for execution some of its simplicity will disappear, for it seems to be more or less arbitrarily imposed on the plan.

The main justification for making any undue sacrifice for the sake of breadth and simplicity of plan is, we suppose, that the loss can be repaid by simpler and sounder construction, an by the greater breadth and finer architectura character of an elevation which is the natura result of such a plan. In this case, however, the elevation, although in itself one of the most pleasing, has no relation to the plan, and gains nothing by this process over those which show no undue sacrifice.

What seems so unaccountable is that, having taking considerable pains and some liberties with the programme to pull the plan together into an architectural form—which presumably he thinks the right form—the author should deliberately go back on himself and refrain from making use of the advantages so obtained by declining to give a straightforward expression of his straightforward plan. He takes some trouble, he appears to think it worth while to make some sacrifice, to obtain the structural suggestion of an interesting elevation, and then he seems to think better, or worse, of it, and hides it all behind a screen wall, as if he was ashamed of it. Had the main bulk of the large rooms been emphasised on the elevations and a separate feature made of the entrance block something characteristic would have resulted. As it is, the elevation is a sham, having no proper relation to the internal structure.

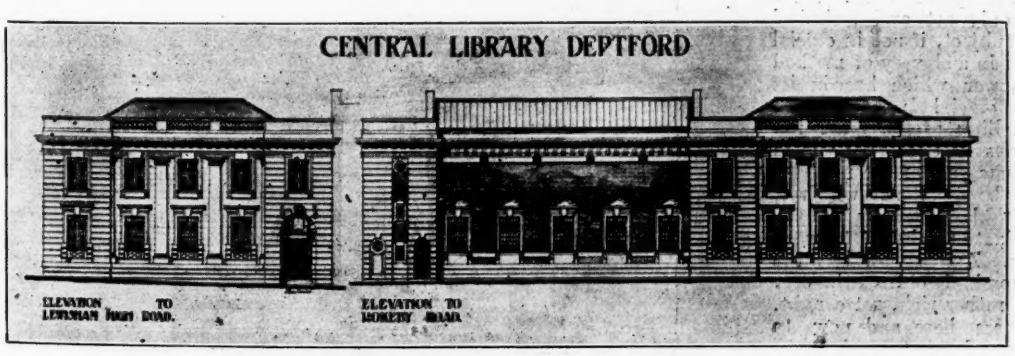
To produce a striking plan and an equally striking elevation having no relation one to the other is not the way to produce architecture, but it may be the way to win competitions while assessors continue to be impressed by such methods.

It must not, however, be supposed that the winning design is the only sinner in this respect. Indeed this falsity of elevation seems to be the weak spot of nearly all the designs that enter from the front. With the exception of Mr. Adams they all shirk the logic of the situation and try to make this entrance front look as if it was one large room from end to end. Curiously enough, they all adopt the same general treatment—a more or less solid mass at either end with three bays between, but as this is evidently not suggested by the plan, we can only guess at its source of inspiration.

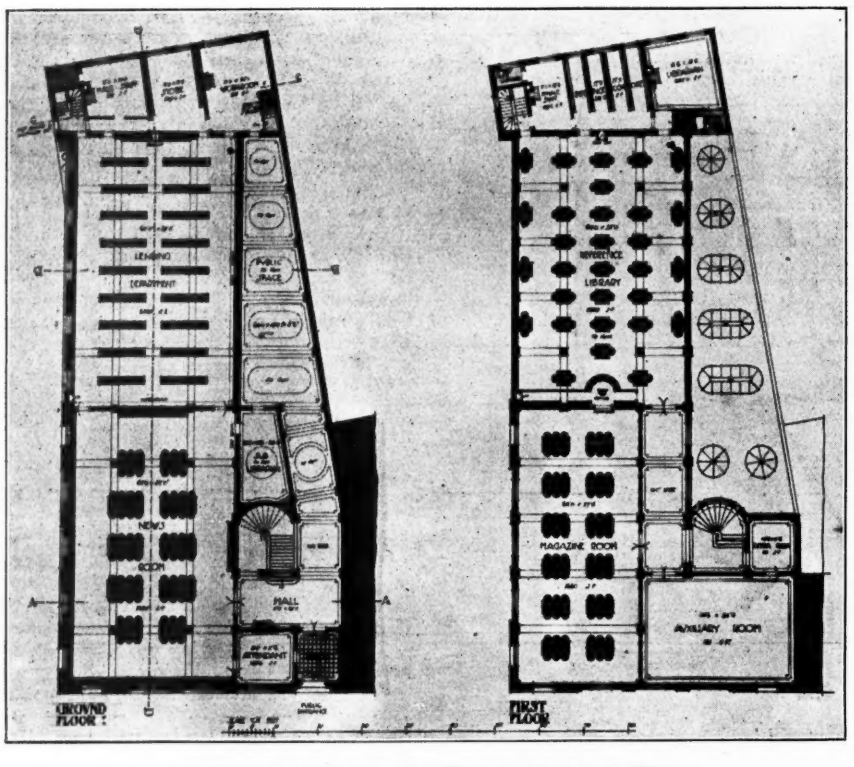
The advantage of the side entrance as illustrated by the designs by Mr. S. B. Russell and Messrs. North & Robin, is that, apart from arrangement, it seems to avoid the necessity for dishonest construction. Neither does it tempt to false elevational treatment of the front. As the newsroom can be taken from end to end the single unit expression of this front, after which most of the competitors seem to hanker, can be naturally and reasonably obtained. In this matter of straightforward expression Mr. Russell's design is, we think, one of the best submitted. The elevations themselves considered without reference to what is behind them—which, however absurd, seems the fashion here—may not perhaps be generally considered so pleasing as those of the winner, but they are more truthful and expressive, and the design generally, whatever its defects, is, in our opinion, more on the lines that make serious architecture possible.

Other designs on the same general lines as the premiated ones are those by Mr. Albert L. Guy, Mr. Arnold S. Tayler—who in sacrificing convenience for the benefit of his sub-librarian obtains an awkward staircase—Messrs. F. J. Eedle & Meyers—whose attractive plan shows a sense of the value of internal architectural forms, but whose treatment of the housekeeper's apartments can hardly be justified—and Messrs. Newman & Newman.

Messrs. Young & Horsley submit a completed alternative. Both designs have pleasing elevations, and both plans show the counter of the lending-library parallel with the book



Second Premiated Design, by Messrs. Castle & Warren.



Second Premiated Design, by Messrs. Castle & Warren.

stacks, and dividing this room from the news-room.

We do not consider that the general level of achievement shown by these designs is any argument in favour of limited competitions.

"SOUTH KENSINGTON."

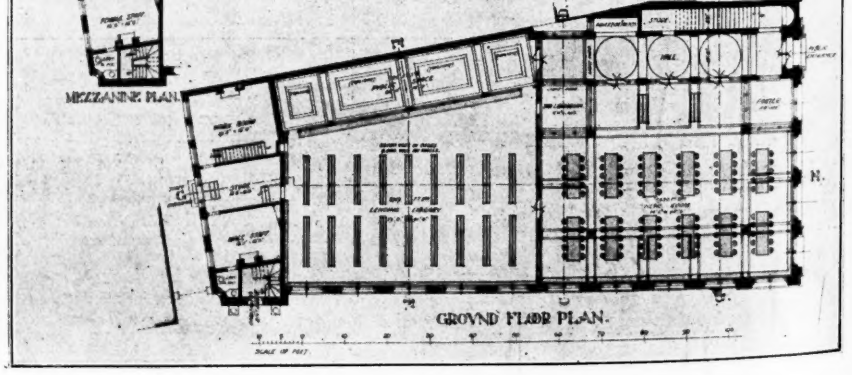
THE EXHIBITIONS OF THE NATIONAL COMPETITION AND THE ROYAL COLLEGE OF ART.

THE exhibition of work by students of the Royal College of Art and that of the prize-winning and the commended designs submitted in the National Competition may be taken and grouped together because they are both for the greater part the outcome of a systematic attempt to educate the nation in art and the crafts, which may be conveyed by the term "South Kensington." The definiteness of the connotation implicit in those words is sufficiently established; all that is official, all, of education in matters connected with the arts, that is controlled from Whitehall is thereby conveyed. And these exhibitions, both open at present, the one of the Royal College, recruited for the most part from those who have graduated—who have obtained a diploma—from one of the many schools associated with South Kensington and subject more or less to its control, and the other, of the National Competition, are the product and vindication of the Board of Education machine.

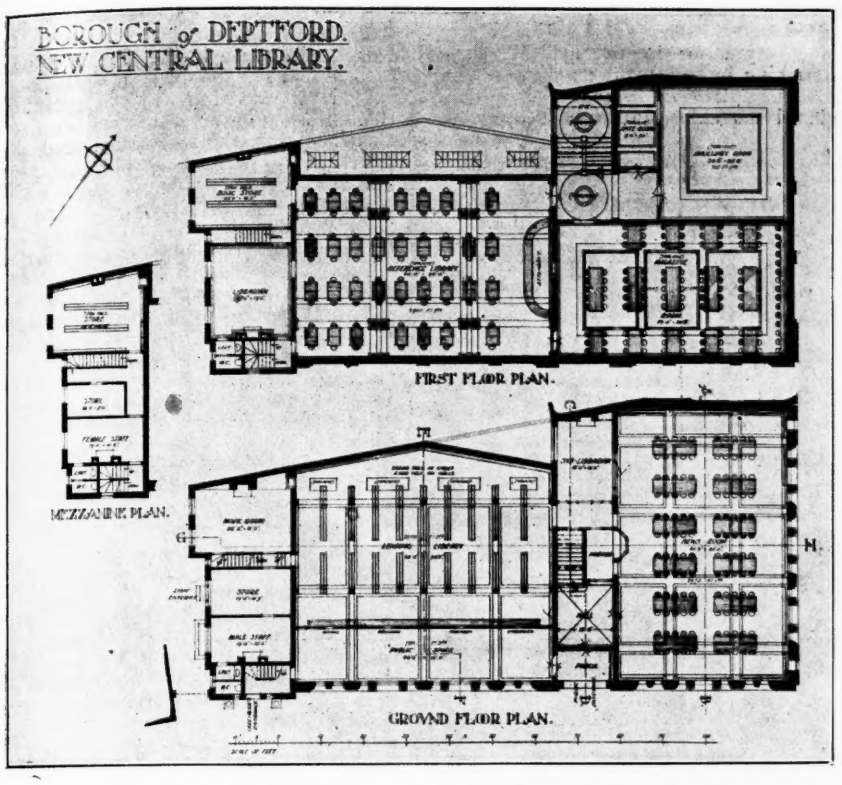
The term "machine" is by no means intended to convey disapproval or contempt. But it should be borne in mind that it is a "machine," that it is an organisation of a sort commonly assumed to be repugnant to the British mind when it turns its pellucid gaze upon affairs of art; an organisation, in fact, in a realm over which a whisper of any such thing must sweep like a blighting wind. It is, moreover, an uncommonly big machine. In every town in the kingdom of any considerable size it has its net spread wide. More often than not the only art and technical school in the place is subject, if not in official fact, then as helplessly in a slavery of method and aim. For the power which has in its gift the mead of official reward with "National" as compelling prefix, must impose, whether it thinks it does so or even wants to or not, some measure of the methods necessary to procure the results of which it approves. The inevitable tendency of the permanent yet subordinate teacher is to work for immediate results. And so all but the very wayward or the seemingly obtuse, the very poor or those who are rather rich, get caught.

It is not our business here and now to expound, defend, or condemn "South Kensington" as an influence in the artistic development of national talent. As a system of teaching it has its apologists, one must confess; by many of those whose opinions really count it stands condemned. But let any who feel inclined to associate themselves with its antagonists reflect that the movement (it is perhaps too firmly rooted in matter-of-fact acceptance now to be called a movement) has afforded innumerable opportunities for learning which might otherwise only with difficulty have been obtained; on the other hand, it may be argued that facility of access may be too pronounced. And so on indefinitely, with innumerable arguments—a case, for one side or the other, being made in the usual way by uttering half of them. We leave the methods to those immediately interested—our concern is with the results.

At the exhibition of works rewarded in the National Competition it is interesting to observe once more that the brighter sections are those by their nature least influenced in their course by the schools. The examples of illustration, for instance, in black and white or in colour, show not only a more complete measure of achievement (natural enough in that, granted talent, no long labour is required), but also an alertness, individuality, and life, which, combined with the knowledge that, except in matters of technique, the school has not necessarily had any hand in it, leads one to the view that this possibility is perhaps the reason of such marked superiority. On the other hand, such productions as (to make use of a sort of generic title) "designs based on a plant," in which "South Kensington," with its pseudo-scientific botanical study has fuller play and more direct influence, are for the most part desperately dull and uninspired. "Nature study" is of very little use to those on whom the afflatus does not descend; tradition is, however, with its appeal to all the associations of culture. It is therefore pleasing to observe that traditional forms are gaining fast, and may soon entirely oust the strugglers *ab initio* from the field. In lace-work, which has suffered much, this tendency is marked and especially pleasing. Indeed, in all the smaller matters of design, those directions in which "South Kensington" formerly held strongest sway, "South Kensington" is being slowly thrust out. Designs for book-covers, embroidery, plasterwork, fabric, and all the little things to which this style may be applied, show more and more that tradition is coming back to its own; and the many examples entitled "Study of the Historic Styles of Ornament" indicate that this return is being encouraged. But there is much more to be done in what would a short time ago have been considered this retrogressive direction before any real advance can be made. Technical ability, often surprisingly precocious (notably in two gold medal jewellery exhibits—we hope age is not taken into account by the judges) is sometimes buried in design which does not deserve a second glance. In no case, naturally, does the design outstrip its execution—if one may in one's mind predicate the possibility of a separation of the two. They are most happily worthy of each other perhaps in the encaustic work submitted by the schools in the Potteries district. Turning, however, to those realms called pure art as opposed to applied (or rather to the technical preparation for it, for hardly any of the exhibits are anything but essays in technique), we find ourselves (for just that reason) unwilling, and perhaps unable, to deliver an opinion (necessarily on technical points) of any value. But what one may say concerning the painting and the sculpture in the course of a consideration of "South Kensington" is that, though at certain schools these arts may be very well taught, at none of them, as far as a spectator can tell, is there an atmosphere permitting the desirable *flair;* that "South Kensington" as an environment tends to suppress



Third Premiated Design, by Mr. Henry T. Hare.



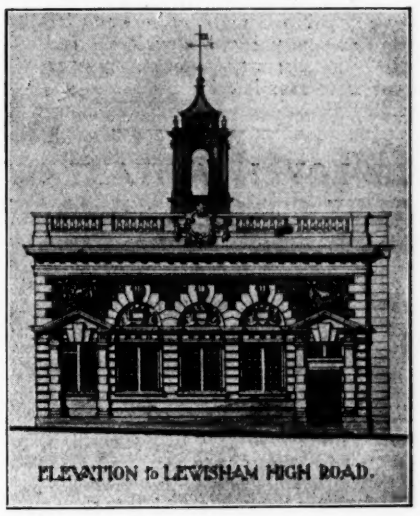
Deptford Library: Alternative Design, by Mr. Henry T. Hare.

expression of the vitality of emotion, which is the essential ingredient. And from the architectural point of view that the decorative aspects of these arts, as far as painting is concerned, appear to be rarely considered, and, as regards the sculpture, but imperfectly understood. There are two ways of sculpture; the ancient Greeks alone have succeeded in achieving in rare instances a synthesis of them both. In the one way the sculpture is "pure" and supreme, and the architecture, its setting, must be "pure" also and abstract to the uttermost degree. In the other, seen in its most vivid expression, in the emotional mood termed the Baroque, the sculpture grows out of the very stone of the architecture it adorns and exists to complete. Modern sculpture, with its subservience to the literal actuality of natural form, is fitted only for the first, and an example here is the Gold Medal design for a fireplace with a carved panel. Of the second way "South Kensington" seems unable to dream. As to the architecture itself (one must assume that the exhibition contains the best there is), it is for the most part bad—or not so much bad as feeble. Feebly taught, if taught at all, so that hardly any of it can claim to have come from a school rightly termed "of Art." It seems as though "South Kensington" in the provinces (with which one must include the various villages of London) might as well abandon the attempt to teach an art requiring the enthusiasm the machine seems to stifle, the intelligence it does not distil, the vigour of attack it fails to inspire, and the metropolitan environment it cannot supply. Merely from a visit to this exhibition in its corrugated-iron shed on one of those strips of waste ground with which that congerie of museums abound, one would think that most of the teachers employed, not in the matter of architecture only, were persons of little culture and lacking any touch of the humanities; of ability, let us concede, in matters appertaining to the technical aspects of what they profess to teach, but otherwise in no way especially fitted to dispense the subtle essences of art.

Turning, however, to the Royal College of Art, apex of "South Kensington," the attitude, inimical to the machine, to which we have found ourselves gradually compelled, suffers a rebuff; but one due rather to the absence of those ingredients of "South Kensington" we condemn than to their justification. At the Royal College we find in Professors Beresford Pite and Gerald Moira, two men of firm individuality, artists, from whose work, apart from their teaching, it is impossible to withhold admiration and respect, and teachers wielding the so essential bias of personality—a quality which "South Kensington," if it does not actually exclude, still can hardly be expected to encourage—suffering as it must from the inevitable inhibitions of bureaucratic control.

In the sections not of painting or of architecture—in those directions of decorative art with which "South Kensington" concerns itself most directly, that is to say—the impression given is merely that of an extension of the other exhibition, of considerable technical ability, with here and there individual merit, but no indication of any definite tendency or exceptional power of personal direction. The coloured glass seems sound, except for an inclination to studied awkwardness of leading (of a fine fitness at times, as in the case of the little three-piece light of the head by Botticelli). There is some pleasing pottery, woodcarving, metalwork, and embroidery of the customary type—taking our impression as a whole. Lettering is good, as it usually is in these days, but manuscript and illumination should be embarked upon seriously, if at all. We find nature study tiresome.

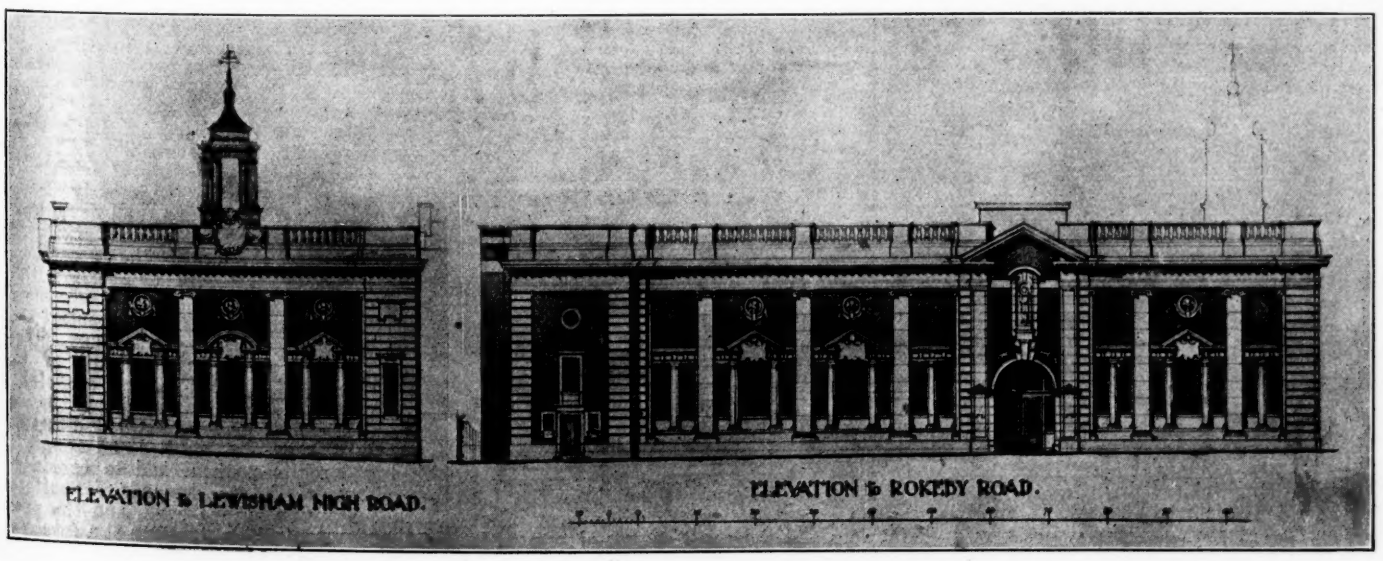
Whether the improvement in the amount of knowledge of architectural detail in the section devoted to "room decoration" is due in any measure to our animadversion last



Deptford Library: Third Design, by Mr. Henry T. Hare.

year or not we are unable to say. It would please us to think so, and afford hope and encouragement to the expression of our view that the improvement can and will continue. There are still exhibits at which the trained architect would laugh, and the colour schemes are often unpleasantly emphatic. It is not enough, too, that thorough knowledge of the grammar of architectural design should be applied to the walls and static features of an apartment. A room should be conceived as a whole replete and harmonious in every particular, even perhaps, in the German fashion, to the size, shape, and tone of the pictures upon the walls.

In the architectural section for the first time in all our peregrination do we find evidence of definite teaching and assured direction. The exhibition is restrained in quantity because from what one knows of the way in



Deptford Library: Alternative Design, by Mr. Henry T. Hare.

which the R.C.A. student works one is aware that only a very small proportion of the work done is shown, and in kind because of the strictness with which the more severe methods of Italian Renaissance design are adhered to. The exceptional facilities afforded by the adjacent Museum are fully used, especially as regards the coloured models of Italian interiors with which it is so well stocked. And the result under Professor Pite is a strongly Italianate style of design, carefully and often remarkably drawn, and freshened with touches of the individual neo-Grecque which the Professor has at times used in his own practice.

Little space remains to us in which to deal with the painting. As is to be expected, the larger essays in decorative painting in point of vigour of colour and design fall as far short of the students' own sketches as of the high measure in these matters attained in Professor Moira's own work. Indeed, we would have expected to see his influence more directly apparent. It is in the monthly sketches of given subjects, interesting and very enjoyable as pictures *sans arrière pensée*, with their very highly-developed feeling for composition, that the effect of the personality of the Professor is felt.

THE ROYAL SANITARY INSTITUTE CONGRESS, BELFAST.

ENGINEERING AND ARCHITECTURE.

THE following is the conclusion of our report of the congress of the Royal Sanitary Institute, which has just been held at Belfast. The report was commenced in our issue for July 28, p. 98, and continued last week on p. 127 :—

Artificial Lighting of Hospitals.

Mr. John Darch in discussing this question said that in visiting the principal London and other hospitals he had been keenly struck with the universal want of discrimination in lighting. There was a kind of trade orthodoxy which cherished certain forms and fittings and decreed their use, often in defiance of common sense. There was to be avoided, on the one hand, the evils of glare, and, on the other, the risk of eye strain consequent on insufficient light, or upon the effort to see in the face of misguided lights. The value of illumination depended not on the amount of light that was shed throughout a room, but on that which was reflected for visible objects. An essential part, therefore, of any scheme of illumination was the colouring of walls and ceilings, the strength of which must be properly balanced with the amount of light available. Dark colours ate up the light, and were therefore wasteful. White ceilings, cornices, and friezes not glossy, with pale-tinted walls and slightly darker dadoes, would best serve the hospital and its inmates. The author, without entering into a comparison of the merits of various lighting media, proceeded to show by means of diagrams how lights should be placed so as to successfully illuminate every department of a hospital.

Mr. Leon Gaster congratulated the Institute on the fact that lighting was being taken up from the sanitarian's point of view. He also pointed out that the French Government had recently appointed a committee, consisting of doctors, architects, and engineers, to consider and report to the Public Health Department on the conditions of different illuminants and their hygienic aspects, etc. He expressed the hope that the Home Office of this country would take the matter up.

Major Blackman referred to the bad lighting of barracks and regimental institutes, and thought it was essentially a matter on which the Government ought to take some action.

Mr. E. T. Hall criticised some of the diagrams of the author, and said his preference was for a light 2 ft. from the wall, but suspended from the ceiling.

Planning of School Classrooms.

Mr. W. R. Webb (Licentiate R.I.B.A.) said the chief object to be borne in mind in the planning of the classroom was to secure the concentration of the scholar on his work, and to afford the teacher complete control of the classroom, isolated and independent, without communication of any kind with the adjoining classrooms. In this respect the general practice in Continental schools was a striking improvement on that of many English examples, in which glazed doors and glazed movable partitions between the

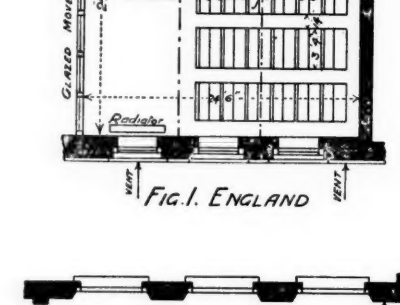


FIG. 1. ENGLAND

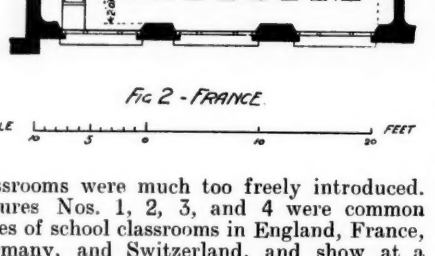


FIG 2 - FRANCE

classrooms were much too freely introduced. Figures Nos. 1, 2, 3, and 4 were common types of school classrooms in England, France, Germany, and Switzerland, and show at a glance the different methods of arrangement of desks and the shape of classrooms.

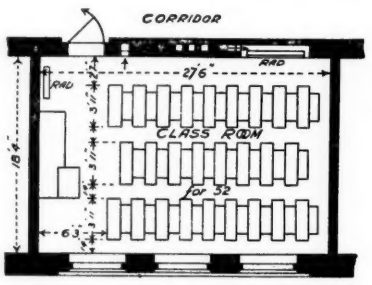


FIG 3 GERMANY

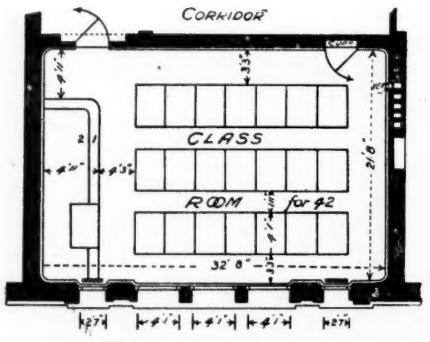


FIG 4 SWITZERLAND

The length of the classroom should be determined by the acuity of vision of the scholars and the vocal energy of the teacher, and the width should be limited by the application of the rules governing the lighting. The application of these two rules had resulted in the adoption in nearly all countries of a rectangular classroom, having length and width in the proportion of 3 to 2 or 5 to 3. The height of a classroom, which should not exceed 13 ft., was determined by the question of acoustics and cost. Many Continental authorities considered that the width of a classroom should not exceed one and a half times its height, which view was confirmed by Dr. Kerr, of the London County Council, who had recently stated that classrooms should not exceed 20 ft. in width. If the suggestions contained in the report of the recent Departmental Committee of the Board of Education on the cost of school buildings were adopted, buildings of the permanent type might be designed by the architect in the various methods of reinforced brickwork or concrete, so successfully employed in other structures; and for those division walls between classrooms, clinker breeze, hollow and solid concrete partition blocks offer considerable advantage in regard to facility of construction and economy in cost. The use of glazed brick dadoes, which are in any case open to many objections, would not be practicable with walls of this description; glazed tiles, which, however, were open to similar objections, could be employed if desired, but in his opinion the use of a cement dado was much to be preferred. The portions of the walls above the cement dado and the ceilings required to be finished with a plaster of a much softer description than that generally used, both for acoustic reasons and to prevent undue condensation. All the surfaces should be brought to as smooth a face as possible, with the internal angles between walls and ceilings rounded in the plaster. The colouring of the walls should be most carefully selected, as the value of reflected light from suitably selected tints could not be over-estimated. The most suitable tints for this purpose were those of the sage-green or eau-de-nil, containing a proportion of about two-thirds of body white. But the dadoes should, of course, be finished with a darker tint with a plain line band as border. Dealing with the various materials for flooring, the author advocated linoleum, the cost of laying which, he said, compared favourably with batten, parquet, or wood block floors. The economy with which cleaning and repairs could be effected were points of considerable importance. Many authorities in this and other countries agreed that the best aspect for classroom purposes from all points of view was that of the south-east. Unilateral left-hand lighting for classrooms was universally recommended and adopted, and the generally accepted rule of the window-glass area in relation to the floor area was in the proportion of 1 to 5. Recent investigations were convincing and conclusive that some means of through or cross ventilation by ample natural preflation obtained by external windows was absolutely essential for perfectly ventilated classrooms. The central system of supplying heat was one which should be recommended for all school purposes. Properly screened open fireplaces, in addition to the other means of heating, should, however, always be provided for the babies' rooms.

Considerable discussion ensued on the paper, which largely turned on the advantages of unilateral and bilateral lighting.

Irish National Schools.

In a paper dealing with the "Cleaning, Heating, and Ventilation of Irish National Schools," Mr. W. R. Maguire, J.P., pointed out that a large proportion of Irish national school buildings were dangerously defective, in bad sanitary condition, and devoid of any attractive comfort for either children or teachers, and he urged the necessity for more Government aid to deal with the defects. He said it would cost more to bring the majority of substantial school buildings erected thirty years ago, structurally sound, up to the standard of to-day than to build suitable modern schools. But where these fine buildings stand they must be utilised; the finer they are, architecturally, the more they cost to alter and adapt. The school architect, then, had to consider the problem of future demands for alteration and extension on one hand, and the possible abandonment of his structure at a future date, and so plan his building on simple lines. Architects are to a large extent called on to act as prophets in designing schools. School

buildings need not be palatial, but rather built for the comfort and benefit of children and teachers, well planned, sound, weather-proof, warmed, ventilated, lighted, easily cleaned and maintained for a reasonable period, sacrificing quite legitimately an eternal durability to the stern demands which limit first cost in this world.

Roads.

Discussing the evils of the dust nuisance and the remedies, Mr. J. S. Brodie (Borough Engineer, Blackpool) pointed out that where financial conditions were favourable the modern road-maker need have no difficulty in laying down a practically dustless road; but with existing water-bound road surfaces the difficulties to be overcome in the prevention of dust were vastly greater. He had found that the treatment of water-bound road surfaces with properly prepared tar compounds at a cost of from 1½d. to 3d. per square yard was the most satisfactory under the local conditions with which he had to work.

Mr. J. Parker (City Surveyor, Hereford) submitted a paper on "Tar Macadam," and discussed the various forms of tar construction at present in vogue. The cost of tarmac in Hereford during the past eight years had varied from 1s. 8d. to 2s. per square yard; steam-rolled ordinary macadam being 1s. 3d. to 1s. 7d. Tar grouting averaged 1s. 7d. per square yard. Tar painting had been done as low as one-fifth of a penny; but the average cost, including the rolling in of Clee Hill ⅜-in. and ¼-in. clean screenings, was 1¼d. per yard.

Mr. H. F. Gullman described the Belfast tar macadam plant, the general features of which were as follows:—The stone supplied from the quarries is delivered at a high level to the drying towers. In its passage, by gravity, through the towers, the stone is thoroughly dried and heated, and passes out at the lower end into a revolving mixer. Boiling tar, of sufficient quantity to thoroughly coat the stone, is also fed into the mixer, and the whole discharged at the outlet, thoroughly mixed, in the form of tar macadam. With a staff of one foreman and five men the output of tar macadam is upwards of 150 tons a week.

Several speakers followed in the discussion, and gave experience of the different systems of tar spraying or painting they had tried, with more or less success, for dealing with the dust nuisance.

Smoke Abatement.

Several papers were read in the different sections dealing with the subject of the smoke nuisance and its abatement, when the use of smokeless fuel, gas, and electricity was strongly urged. Mr. J. Macaulay (Chief Smoke Abatement Inspector, Liverpool), who read a paper before the Sanitary Inspectors' section, advocated the use of more fire-brick and less iron in the construction of domestic chimney places, and said that chimney flues would offer less resistance to the ascending gases if lined with smooth fireclay pipes, properly jointed, than they do now with the rough angular projections formed by the ends of bricks, which make the cleaning of the flues an impossibility.

Discharge of Sewage into Tidal Waters.

Mr. W. Harpur (City Engineer, Cardiff), in introducing the above subject, gave details of an outfall sewage scheme, discharging into the Bristol Channel, which he had carried out, and which had after fourteen months' working proved very successful. If observations as to the safe conditions for discharging sewage into tidal waters were carefully made it would be found that while in certain cases crude sewage might be discharged at all times of the tide, in other cases it would be found necessary to store the sewage in suitable reservoirs and discharge only at certain hours of each tide, while in extreme cases, as at Belfast, it might be found even necessary to pass the sewage through sedimentation tanks, and then to discharge it only at certain periods of the tide, and these conditions he was of opinion were the extreme that was in any case necessary to ensure perfect safety to the community, where suitable points of discharge under proper conditions were available.

Professor E. A. Letts, as the result of investigations into the chemical principles involved in the discharge of sewage into tidal waters, practically endorsed the conclusions arrived at by Mr. Harpur.

Dr. Fowler (Manchester) warned engineers against the employment of disinfectants, such as chloride of lime, etc., as in attempting one thing they might get into a worse state of things.

Mr. Cotterill (Bristol) emphasised the importance of dealing with each case on its merits, and said that Mr. Harpur's scheme at Cardiff furnished a case where no injury could arise, and another instance was that of Torquay.

Mr. Barker described the methods adopted at Portsmouth, where the crude sewage was discharged into a large volume of water which passed out of the harbour at a rapid rate.

Mr. A. J. Martin agreed that drastic safeguards against disease germs might do far more harm than good if they upset the balance of nature.

Incompetent Engineers and Architects.

Mr. P. C. Cowan (Chief Engineering Inspector of the Local Government Board for Ireland), who presided over the sitting of the Conference of Municipal Representatives, dealt with the law in force in Ireland with regard to engineers and surveyors, and said in some respects it was more favourable than the law in England. The absence of provisions in the statutes to prevent incompetent persons from acting as engineers and architects was much to be regretted, and doubtless accounted for the low estimate often put on their services. It was a matter which could be more easily dealt with than the wider question of registration of engineers and architects, and the thin end of the wedge had been inserted by the provisions of the Labourers Act of 1906, which laid down rules as to the persons who should be deemed eligible for employment as architect, engineer, or surveyor. He ventured to think that the time was now opportune for legislation which would protect engineers and architects from unfair competition, and the public from the very serious loss which now arose from their displacement by practitioners who were not qualified. There was now a sufficient supply of properly-trained men, and no good reason why the safeguards afforded to the practice of law and medicine should not be extended to those whose function was "the art of directing the great sources of power in Nature for the use and convenience of man." If the Institutions of Civil Engineers and the corresponding Architectural Associations and the Universities were to combine in a effort to secure proper recognition of the professions of engineering and architecture, success would ere long be obtained.

National Sanatoria.

Mr. E. T. Hall, F.R.I.B.A., gave the paper he had prepared for the Engineering and Architectural Section as a popular lecture on the closing evening of the Conference. He said that "National Sanatoria" was now proposed to be recognised as a national obligation, whereas hitherto it had been left to private charity. The author gave some details of the number of consumptives in the country, and remarked that the sanatorium in a nutshell was the embodiment of the root idea of open-air treatment under medical supervision. There was much to be considered in the selection of a site for a sanatorium. First of all, in considering competing sites they must ascertain the average number of hours of sunlight to which they were subject, and give preference to those with the best record; next, learn the relative humidity of the air from local causes, and note that site which had least. A great altitude was of no importance. What was important was that the site should be open to the winds of heaven, that was to say that there should be free currents of air all round and through the buildings, that there should be abundant access for sunlight, and it should be cheerful. To attain these ends the site should be elevated above the land to the south, and on the colder sides it should be protected. But here a note of warning was necessary. By many a dense belt of woodland quite close up to the building on the northern and eastern sides had been encouraged. That was a mistake. Trees should be cut back to a considerable distance, and avenues should be made through them to allow great rivers of air to sweep through and around the buildings. Prospect was of great importance. Shut in by woods or other limitation of panorama, a feeling of depression was engendered which was greatly to the detriment of patients. Extensive views, on the other hand, broadened the outlook not only of the physical eye, but of the mental vision. Subsoil was of importance. Clay as a subsoil was liable to get waterlogged, with resultant mists from evaporation. Gravel pockets in a general clay formation were not good, because the subsoil water became stagnant and gave off noxious gases. Loose sand on the surface was worse of all, the gritty brittle particles blown by the winds were great irritants to the respiratory organs. A rocky soil was best, so long as it had a verdant supersoil. The greensand formations were good, and pine-trees flourish on it with their resinous perfume. The buildings should be set well away from all dusty roads. As to the type of building itself, much had been said and written as to the relative advantages and single and multi bed wards, of isolated huts and congregated rooms. Single huts were reasonable were few patients had to be treated. The one-room habitation was primitive, whether it be of wattle, of canvas, or of boards; but if a large number of people were to be housed, fed, and supervised, and were to have the amenities of prospect and open surroundings, their huts would cumber the ground, and their abodes must be brought together so as to leave the necessary open spaces. This eventuated in a large building, or might be series of buildings, where apartments for patients were convenient of access from the administration, where baths for washing and for hydrotherapeutic treatment, and sanitary accessories might be disposed for general convenience, and where drainage might be concentrated and minimised.

If this be admitted as the necessarily practical development of the aggregation of sick persons, as in its essence it accounted for the formation of towns, then he thought it would be fair to say that public sanatoria which had to deal with the masses should be started on the lines in which, as they became larger, they must develop. Practically all the sanatoria dealing with any considerable number of patients abroad or at home were on the concentrated principle.

The author proceeded to discuss the question of planning, and said that he felt sure from his own investigations and from conversations with medical superintendents that the large majority of rooms should be single bed, but that a few of two, three, and four, and perhaps five, might be of advantage. Large wards were to be deprecated. It was manifest that cost was an element of great importance when large numbers had to be dealt with; that the prevention of fire was another. The cost per bed varies naturally in relation to accessibility of building material and cost of labour. Sanatoria in England, built of brick and stone as distinct from temporary wooden structures, ranged from 350*l.* to 1,000*l.*, and it was said in one case to be nearer 2,000*l.* per bed. In cases where local material was not available, when the distance from a railway was considerable, and where the institution is a large centre, self-contained, perfectly equipped, and built on up-to-date hospital lines, providing its own water, electricity for power and lighting, its heating and hot-water installations, its laundry full of machinery, engine and boiler house, kitchen, etc., fitted with labour-saving plant, ovens, etc., stores, recreation-room, workshops, research laboratories, mortuary and post-mortem rooms, an elaborate system of drainage, residences for medical and nursing staff, servants, gardeners, etc., he did not think 500*l.* per bed was excessive. These central institutions were necessary, and filled a definite place. But the sanatoria under the Insurance Bill could not be of the same elaboration. They ought not to be of boards (that material was far too dangerous in a wooded district), but might be, *pace* all by-laws, of a permanent character, one story in height, with walls and roof 3 in. or 4 in. in thickness, without elaborate foundations and all the cost these entailed. As a result of a lot of study, he showed on the walls designs of sanatoria of various sizes which he believed could be erected on a suitable and fairly accessible site for 100*l.* per bed. He had standardised every part of the construction as well as the eight-bed units of wards, the units of administration and of residence. The two latter were made

proportionate to the number of beds. If a sanatorium of sixteen beds was erected it could be increased at any time to thirty-two or forty-eight or sixty-four or more with a corresponding increase in other departments, without pulling down the old. A laundry was provided at the north. The enclosing material, including floors, was of non-combustible slabs of standard size, impervious to vermin and readily fitted together. A pure water supply was, of course, a *sine quâ non*, and if no public gas supply was available a small plant could be installed for heating baths, for cooking, and for lighting. Fireplaces of special design to avoid dirt were adopted, to avoid the great expense of an engineering plant. Earth closets could be used if the site was in a rural situation. The drainage would then be of soiled water only, taken to cesspools, emptied by suction carts as at Nordrach, and distributed on the agricultural land. If a small establishment of sixteen beds was in contemplation, a qualified matron and nurses would be supervised by a non-resident physician. For thirty-two beds, quarters were provided for a resident medical superintendent. For forty-eight provision was made for two resident doctors, with a matron, a housekeeper, and, of course, a larger staff of nurses and servants.

It was suggested that, as at Frimley, patients should not only be trained to make their own beds, but to do all kinds of other work, such as digging and planting, carpentering, painting, etc., so that the maintenance would be reduced to a minimum. In all essentials it would be seen that the design comprised everything that was found in the larger and more costly sanatoria. All rooms faced south, south-south-east, and south-south-west. Each unit had six single-bed and one two-bed ward, with a sanitary annex and linen store. Each unit was detached from its neighbour, allowing for classification and avoiding the spread of fire in the possible event of carelessness. All rooms were accessible at the rear by a covered verandah, and had a terrace in front covered at discretion, either by a glass roof, or, as at Frimley, by canvas shop blinds. A common dining-room was in the central block, close to the kitchen and stores. The whole scheme was one for open-air treatment in the fullest sense.

The Most Rev. His Grace the Lord Archbishop of York has consented to accept the office of President of the Twenty-seventh Congress of the Royal Sanitary Institute, to be held in York in July, 1912.

THE ROYAL ARCHÆOLOGICAL INSTITUTE IN SOUTH WALES.*

ON Friday, July 28, an excursion was made by rail and motor-cars to Coity Castle, which was described by Mr. Hope. It consists of a pear-shaped inner wall, originally encircled by its own ditch, and containing all the principal buildings, as well as a curious semi-detached round garderobe tower projecting from it southwards from behind the hall and lodgings. There is a gatehouse on the north-east, and the remains of another on the west that communicated with the outer ward. This seems to be an addition to the first plan, and is roughly oblong in plan, with a gatehouse in its western end. The whole of the castle buildings are mainly of the XIIIth century, but everything is now in such a hopeless state of ruin that it is difficult to find architectural details from which dates may be deduced. Some interesting details concerning the successive owners of the castle were contributed by Mr. Iltyd Nichol. Coity Church, which adjoins the castle, was next visited, and described by Mr. Brakspear. It is a small aisleless, cruciform building with a tower over the vaulted crossing, all of early XIVth century work. In the north transept are two charming little XIVth century effigies of Tueberville children—a boy and a girl. In the chancel stands a five-gabled oak cupboard of late XVth century date, ornamented with emblems of the Passion. The journey was next continued to the church at Coychurch, which resembles that of Coity in plan. It has a fine lofty arcade to the nave, with good open roof, with panelling in the first bay over the place of the rood-loft. In the north transept is an interesting effigy in cassock and surplice of Thomas Ivans, clerk, "parson of this church," 1591, and a late XIVth century effigy of a layman. After luncheon at Bridgend a visit was paid to Ewenny Priory Church, which was described by Col. Tueberville. The priory was founded early in the XIIth century by the lords of Ogmore, one of whom, Maurice of London, gave it as a cell to Gloucester Abbey in 1141. The church of that time, which alone survives, consisted of a vaulted presbytery, north and south transepts, each with two eastern chapels, a low middle tower, and a nave with north aisle only. The north transept and all the chapels are now ruined. The church was both parochial and monastic, and there still stands under the western arch of the crossing the screen wall against which the nave altar was placed, with procession doors at either end. Mr. Hope pointed out that the XIVth century wooden screen now under the eastern arch could not possibly be in its original place, which was across the nave at the second bay, where the grooves for fixing it still exist in the pier. Mr. Hope also showed, from the position of the various doorways, what was the old arrangement of the eastern arm prior to the suppression of the priory. The church contains an extensive series of incised slabs and early monuments. The priory precinct was fortified by a wall and towers in the XIVth century, and is still entered by two of the original gatehouses with alterations of the later date. The party subsequently returned to Cardiff. At the evening meeting Mr. W. H. St. John Hope gave an account, illustrated by lantern slides, of the extensive excavations carried out in 1909 and 1910 by the Society of Antiquaries at Old Sarum. These had brought to light the remains of the castle that once occupied the site, including a curious postern-gate and tower and a keep of remarkable plan, with an unusual series of garderobe shafts. The works are still in progress, and will probably be spread over a number of years.

On Saturday, the 29th, the party first went by train to Pyle, and thence by motor-cars to Margam Abbey. This was described by Mr. Brakspear as having been founded for Cistercian monks by Robert, Earl of Gloucester, about 1150. Part of the nave of the first church, with simple round-headed openings for its arcades, remains, and is still used for service. The transepts and presbytery were rebuilt on the same plan as Tintern in the XIIIth century, but are much ruined. Of the monastic buildings nothing is left but the foundations of the eastern range, with the bridge to the reredoster, and the shell of the chapter-house. This stands clear of the range, through which it is approached by a vaulted vestibule, and was round within and polygonal without. The vaulting, which sprang from a central pillar, fell in 1774, but the building is otherwise fairly perfect.

The contrast between the sylvan surroundings and beautiful gardens of Miss Talbot at Margam and the blackened and sordid site of Neath Abbey, which was next visited, is remarkable. Otherwise the remains of Neath Abbey are even more important. According to Mr. Brakspear, who again acted as guide, the abbey was founded about 1130 by Richard de Granville for monks of the Order of Savigny, but the buildings date from the XIIIth century. To this period belong the considerable remains of a church of the Tintern type, with all its parts vaulted; also the western range of buildings and much of the doster range, with its vaulted undercroft and bridge to the reredoster, like Margam. The buildings owe their preservation to their having been converted into a manor-house at the suppression by Sir Peter Hoby, and considerable remains of this exist. The sites of the church and cloister would well repay excavation if properly carried out. Later in the day the journey was resumed to Tenby, in readiness for the second part of the meeting in the district about that town.

The proceedings at Tenby began at 10 a.m. on Monday, July 31, at the Town Hall, where the Mayor (Captain Hughes-Morgan), in his official robe and chain, and supported by the aldermen and councillors, with the attendant sergeants-at-mace, formally welcomed the Institute on behalf of himself and the Corporation. The party was then conducted round the town by Mr. Edward Laws, who described the remains of the Norman castle and of the walls, towers, and gates built about the town, probably by William of Valence, Earl of Pembroke, about 1328. Much rebuilding of these was carried on during the XVth and XVIth centuries, but a good deal has since been destroyed, particularly on the two sides next the sea. At noon the party again assembled at the Town Hall, to join, by special invitation of the Mayor, in the state procession for the annual opening of St. Margaret's Fair and the Pie-Powder Court in connexion therewith. Headed by a brass band, and preceded by police constables, the procession of Mayor, Corporation, mace-bearers, and archæologists, with divers townsfolk, wended its way through the principal streets to the scene of the Fair in St. John's Croft, with occasional halts while the crier proclaimed the Fair and Court open, in accordance with the charter of Queen Elizabeth.

After lunch a visit was made by sea to Caldey Island, where Mr. J. Coates Carter acted as guide. The little church used by the islanders was first inspected. It consists of a square nave and a chancel of smaller size, all of the simplest possible character, and Mr. Hope said he saw no reason why the pre-Norman origin claimed for it should be disputed, though little architectural evidence existed except part of the west doorway. Hard by are the modern buildings of the abbey of the English Benedictines, established then by charter of the Archbishop of Canterbury, and whose fame has brought the island into special notice. The old buildings of the small Benedictine priory that existed here until the suppression were described by the Rev. W. Done Bushell, to whose residence they are annexed, and are of special interest not only from their small size, but as having been the first home of the Benedictines on their re-establishment on Caldey Island. They comprise an aisleless church of the XIIth century, with vaulted quire, and western tower and spire, with a small cloister on the north, with a western gatehouse, and much of the eastern range. In the church is the famous Caldey stone, with its Latin and Ogam inscriptions. The party subsequently re-embarked for Tenby, after an enjoyable afternoon. The evening was filled by a conversazione given in honour of the Institute by the Mayor and Mayoress of Tenby, at which the valuable series of charters given to the town was exhibited, as well as the two silver maces and the records of the old manorial courts. A number of prints and objects of local antiquarian interest were also exhibited by Mr. Edward Laws and Miss Ett-Edwards.

[*To be concluded in our next issue.*]

* Continued from page 131.

GENERAL NEWS.

Professional Announcement.

The office of Mr. Edw. Dru Drury, District Surveyor, will in future be at Parliament Chambers, No. 14, Great Smith-street, Westminster, S.W. Telephone: 1587 Victoria.

Hampton Court Palace and Precautions Against Fire.

The Office of Works have taken steps to greatly improve the means and appliances for dealing with any outbreak of fire in the Palace, and have thoroughly overhauled the water supply. They have installed a special fire alarm, which affords direct communication with the fire-station at Kingston, and have made arrangements with the Kingston Fire Brigade for rendering their prompt assistance if required.

The London Museum.

A movement is afoot for providing a suitable and permanent building for the collections which are now housed temporarily in the State apartments of Kensington Palace. The London County Council have agreed to offer upon permanent loan to the Trustees all the valuable and multifarious objects and relics which they have preserved and which are at present stored in the Horniman Museum at Forest-hill, in the County Hall at Lambeth, and in the Exhibition at Shepherd's Bush.

Decoration of the Royal Exchange.

Mr. F. O. Salisbury is appointed to paint the panel which Alderman Sir Charles Wakefield will present to the Gresham Committee. The panel, having for its subject the rebuilding of the wall of London by King Alfred the Great after the departure of the Danes, will be fixed in the ambulatory.

The British Pavilion, Rome Fine Art Exhibition.

We learn that the British Government have ratified an agreement to purchase the Pavilion of the British Section, with a view to the establishment of a permanent British Palace

of Fine Arts in Rome. The building was erected after the plans and designs of Mr. E. L. Lutyens, F.R.I.B.A., the general scheme being modelled, with the necessary modifications, after the façade of St. Paul's Cathedral.

The National Portrait Gallery.

A Government Bill is passed for third reading in the House of Commons which provides for the transfer from the War Office and vesting in the Office of Works some land that appertained to the St. George's Barracks, in order that it may be utilised for extensions of the National Portrait and the National Galleries. In the case of the former the Trustees, in their fifty-fourth annual report, which has just been issued, direct attention to their existing urgent requirements for further room, and to a considerable extent, inasmuch as the available wall space is so completely occupied that it is almost impossible to find proper place for new acquisitions. In addition to engravings, photographs, and similar supplementary reproductions there are 1,605 registered portraits. In the year 1910 a total of 175,251 persons visited the Gallery.

The Road Board and Advances in Aid.

With the sanction of the Treasury a third batch of advances from out of the Roads Improvement Fund has been made by the Road Board to highway authorities and county councils. The advances amount to an aggregate of 111,000*l*., whereof 6,600*l*. is for England, so that the total sum advanced in January-June last is 275,390*l*., of which 209,890*l*. goes towards the improvement of road crusts, and includes grants in aid tar macadam and surface tarring.

CORRESPONDENCE.

The King Edward Memorial.

SIR,—By a happy inspiration Professor Adshead appears to have solved the difficulty of finding the site for the memorial to our late King. Professor Adshead's plan for placing the memorial at Hyde Park-corner provides a most appropriate site for it, and at the same time transforms what is now an ugly open space into one of beauty. Decimus Burton's arch on Constitution Hill, now so awkwardly placed, will be brought into symmetry with its surroundings, and Hyde Park-corner at last become worthy of London.

It is only necessary to place side by side Professor Adshead's plan and a plan of the area as it now is to at once realise the vast improvement which would be effected by carrying out the proposal. Probably there never was another proposal for so great a Metropolitan improvement realisable at so moderate a cost. MARK H. JUDGE,
Honorary Secretary of the Further Strand Improvement Committee.

Gidea Park Competition.

SIR,—Apart from the question raised by Mr. Webb in his letter regarding the desirability of architects entering into competitions involving building, he seems to be under several misapprehensions in the matter of the above competition. Surely he does not imagine that the 140 or so architects bought the land and built houses solely on the chance of obtaining one of a few prizes. There was, indeed, the chance, but for the bulk of the competitors it was a small one, and without any doubt the competition was regarded as a building speculation.

Mr. Webb's letter gives the impression that the charge for opening houses and watering gardens is a compulsory one. This is not the case, and it is purely optional on the part of competitors whether they avail themselves of these arrangements.

Again, it is optional for competitors to employ the company to act as agents for the sale of their houses, and the handsome consideration referred to by Mr. Webb is the ordinary agent's commission.

Speaking as a competitor, I know from experience that the company have been most helpful to competitors, and have assisted them in every way. The competition was organised as a business transaction, and competitors have entered it as such with their eyes open. CHARLES W. YATES.

Deptford Central Library Competition.

SIR,—Can the award as regards the first premiated design in the above have been made regardless of the conditions attached to the competition? To me it appears undoubtedly so.

For instance, the newsroom in this plan is without supervision of any kind, while it was distinctly required by the conditions that the lending library and the attendant's lobby should both supervise this room. Again, the sub-librarian s room, as now planned on this scheme, is impossible for the use intended.

Many other conditions have been ignored in a manner which suggests to me that this award is unfair to those competitors who regarded the conditions as governing the competition, and submitted their designs in accordance therewith.

There was a distinct clause in the conditions by which any designs not conforming to them would be excluded. Comment is needless.

I may mention that I am not a competitor, nor have I interest with any of those who have submitted designs. NONPLUSSED.

Architects and Shop Design.

SIR,—In your issue of March 24 you have a paragraph referring to the shopkeepers' objections to Mr. Norman Shaw's fine design for the rebuilding of Regent-street.

That the design is not a good one from a shopkeeper's point of view is apparent to any architect who has had experience in designing this class of building, but the same design, with a very slight modification, can be continued and give the shopkeepers all they desire—plate glass.

I think in the matter of shop design we Straits architects have solved the difficulty, as the enclosed tracing will show. We agree with the shopkeeper that the maximum area of shop window is necessary, but we never carry our heavy superstructure on plate glass and glazing beads, as is usual in Europe. As you will see, we put up a masonry structure with piers that appear capable of and do carry the weight of the building above. This is built out to the building line, and we then put in a plate-glass front, which is simply a huge showcase, some 5 ft. to 8 ft. back, and this looks exactly what it is—a fitting that can be moved in any way, as it does not carry, nor does it appear to carry, any weight.

This system has other advantages from the shopkeeper's point of view, as it gives the public a covered space from which to view the display, and saves the cost of sun-blinds. Of course, against this has to be placed small loss of area on the ground floor. The enclosed plan is not a lone example, but one that is always adopted here.

Singapore. ARCHITECT.

Temple of Artemis.

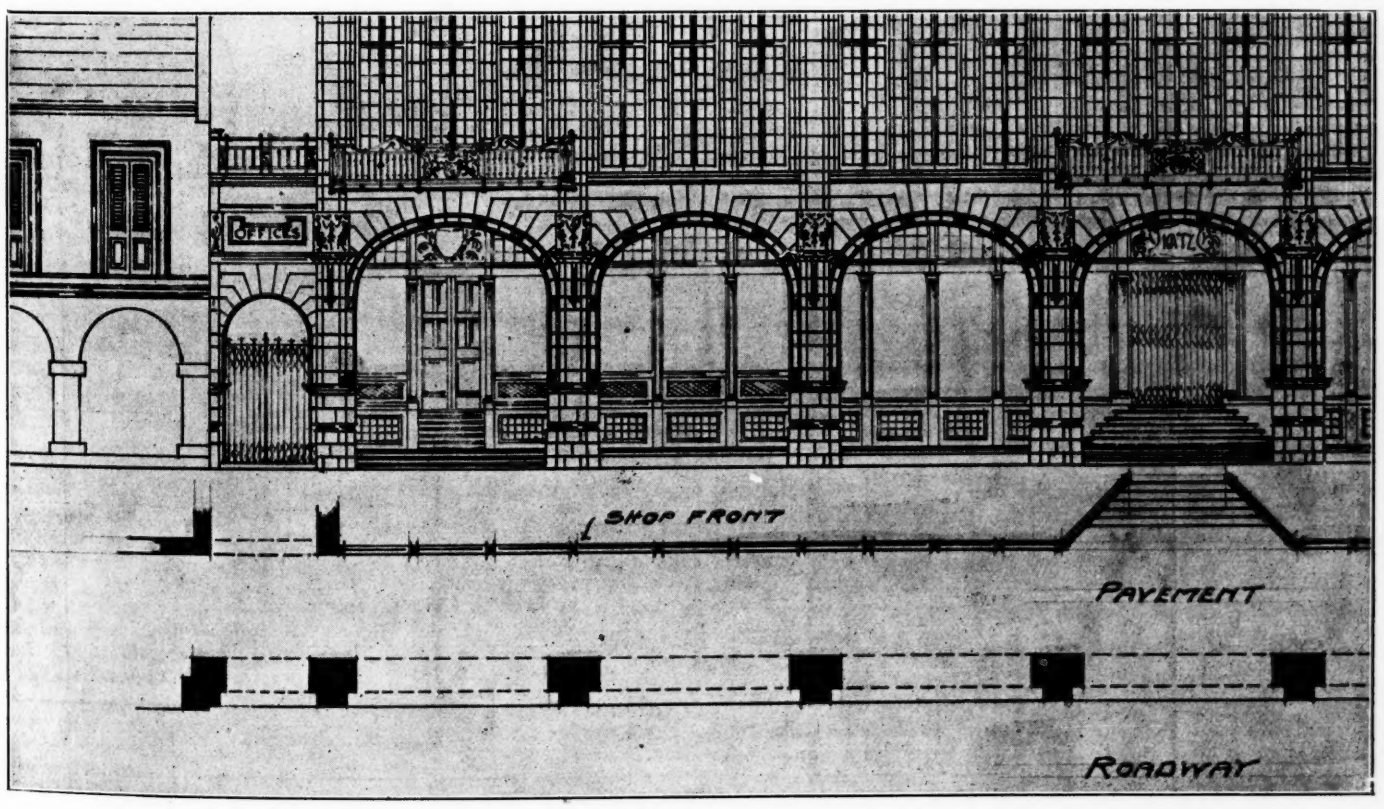
SIR,—I notice two slight mistakes in the above article. The first should read 60 Greek ft. = 60 ft. 9½ in. English, and the second should be large dentils or square consoles.

A. E. HENDERSON.

INTERCOMMUNICATION COLUMN.

Rainwater "Tipper."

We hear that the "Roberts" rainwater separator is supplied by Messrs. Frederick Braby & Co., Ltd., Ashton Gate Works, Bristol.



"Architects and Shop Design."

EDITORIAL SUMMARY.

The leading article is entitled "Evidence in Private Bills," and has reference to the method of obtaining architectural evidence before Parliament.

Our second article, "The Architect as Builder," deals with the Gidea Park Competition (p. 154).

Notes (p. 154) include: "The Citadel of Aleppo"; "The Architect's Judicial Position"; "The Greater London Railway"; "Hyde Park Corner for King Edward VII."; and "The Traffic Question."

In this issue we commence a series of articles on "The Story of the Bridge," with illustrations (p. 155). One page of our plates is given in connexion with the article.

An illustrated article on the Deptford Library Competition appears on p. 156.

An article entitled "South Kensington" will be found on p. 158. It includes notices of the National Competition and the Royal College of Art Students' work.

Our report of the Belfast Congress of the Royal Sanitary Institute is concluded in this issue (p. 160).

Our report of the proceedings of the Royal Archæological Institute in South Wales is continued this week (p. 162).

Correspondence (p. 163) includes: "Gidea Park Competition"; "Temple of Artemis"; "Memorial to King Edward"; "The Deptford Library Competition"; "Architects and Shop Design."

The Monthly Review of Construction (illustrated) contains: "Building in Canada"; "Notes on Some Definitions Used in Structural Mechanics"; "The Tower of Pisa"; "Reinforced Concrete Girders"; and Note (p. 165).

The Building Trade (p. 169) includes: "Australian Building and Labour Notes"; "Is Pointing in Brickwork Doomed?"; "Some Legal Questions about Extras"; "Building and Labour in Melbourne"; "Projected New Buildings in the Provinces"; etc.

Law Reports (p. 172) include: "Action by Contractor against Building Owner."

COMPETITION NEWS.

Deptford Central Library.

In connexion with this competition the Borough Council, at its meeting on the 1st inst., opened the award of the assessor, and it was found that he had placed Design No. 8 first, Design No. 7 second, Design No. 6 third. The envelopes containing the names and addresses of the competitors having then been opened it was found that the authors of the above-mentioned three designs were as follows:—

No. 8 (first), Sir A. Brumwell Thomas, 37, Old Queen-street, Queen Anne's Gate, S.W.
No. 7 (second) Castle & Warren, Amberley House, Norfolk-street, W.C.
No. 6 (third) Henry T. Hare, 13, Hart-street, Bloomsbury-square, W.C.

Axminster Cottage Hospital.

In the recent competition for a design for the new Axminster Cottage Hospital, the scheme prepared by Mr. Leslie T. Moore, A.R.I.B.A., of 3, Raymond-buildings, Gray's Inn, W.C., has been placed first by the assessor, Mr. G. H. Oatley, F.R.I.B.A., of Bristol. The contract of 1,725*l.* is being carried out by Mr. R. G. Spiller, of Chard, Somerset.

CONTEMPORARY ARCHITECTS AND THEIR WORK.

In our account of the life and work of Professor Blomfield, A.R.A., which appeared in the *Builder* of July 28, there are two errors:—(1) Professor Blomfield got a leaving exhibition at Haileybury, and a scholarship at Exeter College in 1875, not a "scholarship exhibition," as stated. (2) He went up to Oxford in January, 1876, and took a first in Greats in December, 1879, not 1870, as stated.

ILLUSTRATIONS.

On Loggie.

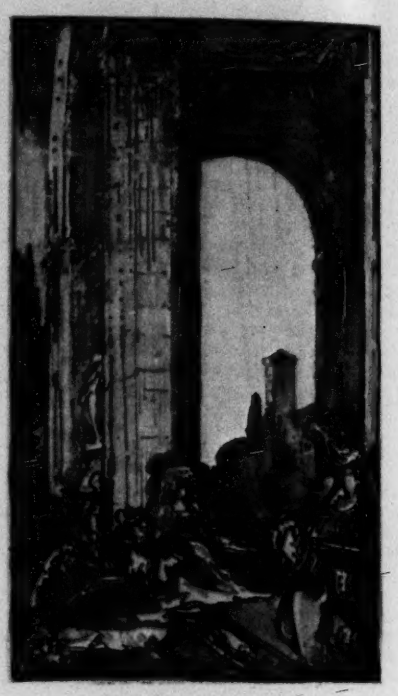
THERE are two supreme divisions of architecture, and as they are supreme so are they primitive, as they are eternal so have they their counterparts in the earliest life of the race. The first of these is the building of tombs, because men build tombs for their dead before they build houses for themselves, and the second is termed secular building to distinguish it from the first. All architecture is of these two kinds, of which the cairn and the mound for the one and the plaited bower of branches for the other, are the basic nuclei.

But before man began to build at all and for long after that time, there remained, as the customary setting to all his deeds, the architecture of nature—"sylvan fanes" and "craggy fortresses," with which we may assume Eden was replete. It should always be kept in mind that structure beyond man's stature and not made by him for his use, was the first emplacement given by Jehovah; architecture as a setting to lives of natural leisure was the primitive intention of the gods. The conception of its only purpose was theirs, with the name we credit them in retrospect, for it is the postulate condition of architecture that it shall have been made by man.

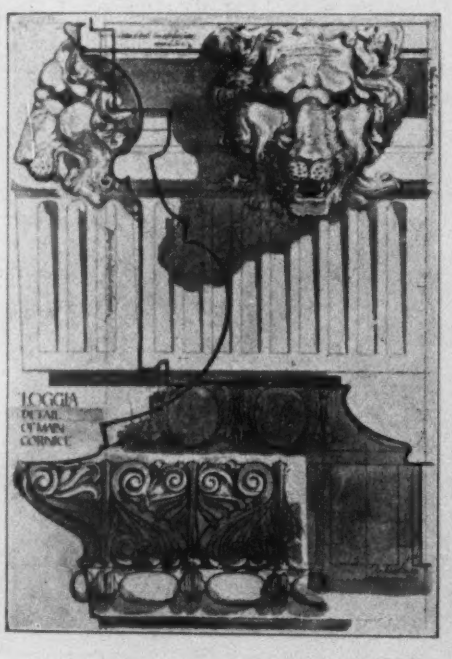
Now architecture lies in just that part of building—those proportions, this form, that colour—which is superfluous and superior to the mere necessities of the case, empirically considered. Your common fellow is right, from his point of view, and a sound critic in his estimate of architecture as trimmings and adornment; but there are not lacking even to-day, those who think the mere fact of building of little moment and an edifice of no account at all, unless its functions, by the agency of art, fashion its proportions and parts into terms of fitness, if not into forms of beauty.

It is in those kinds of building then, wherein the form is most nearly conditioned only by the significance it has to express and the beauty it must embody, that the purest satisfaction of Urania will be found and Clio will discover, since at this later year of grace she is come into her own—safest refuge, truest zeal, and steadfast satisfaction. The primitive division of building into two kinds still persists on the higher plane of art. And precisely in the proportion that its forms are supreme do examples enfold the embryo of the type. From the first cairn to the Pyramids, from them to Halicarnassos, from that to the Albert Memorial, or one more recent still, is but a flickering open of the eyelids of the mind.

Of all that pertains the gods and to the state of death their realm, the cairn is still in fact the purest art. And as for the sylvan bower, in that which is nearest still to its early use, in these sad days the Loggio are dead. Commerce and Calvinism—twa corbies—have plucked their e'en. Tangled terrace makes their ditch, arch and shadow are their breast-plate, arabesque their damascene; sonnets are their vanished valour. Not the Loggia di Lanzi—that's the agora of the Hellene or the atrium of the Roman, not a loggia at all. As well "the Street" in New York City or Threadneedle-street in ours. For these places have their uses, contrary to the precepts of the gods. No, the loggia is private, intimate and undisturbed—its shades and vaulting coloured with the fragrance of the lute. Careless are those who are in it and forgetful of all but themselves. For this is not Olympus, which is more a belvedere. It is like the earliest garden, but nothing like so tiresome. Apex of the centuries—its floor is strewn with only the peel of apples from the tree.



A Loggia.



Detail of Design for Loggia.

By Mr. Adrian Berrington.

"The Story of the Bridge."

THESE illustrations are given in connexion with the first of a series of articles on the subject, which will be found on p. 155.

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SEWAGE SCHEME FOR HARTLEY WINTNEY (HANTS).

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WINCHESTER CATHEDRAL RESTORATION WORKS.

The Dean and Chapter have presented a silver rose-bowl to Mr. W. R. Walker in testimony of his services during the past six years upon the restoration works at the Cathedral. Mr. Walker, a diver, on the staff of Messrs. Siebe, Gorman & Co., of Lambeth, working in absolute darkness in 20 ft. of water, succeeded in gradually excavating the peat at the foundations and in spreading cement, which was lowered to him in bags. Pumping operations were discarded through fear of drawing the sand and silt away from other parts of the foundations, and the use of artificial light was found to be impossible. Mr. Francis Fox, C.E., in diving dress, examined from time to time the progress of the work.

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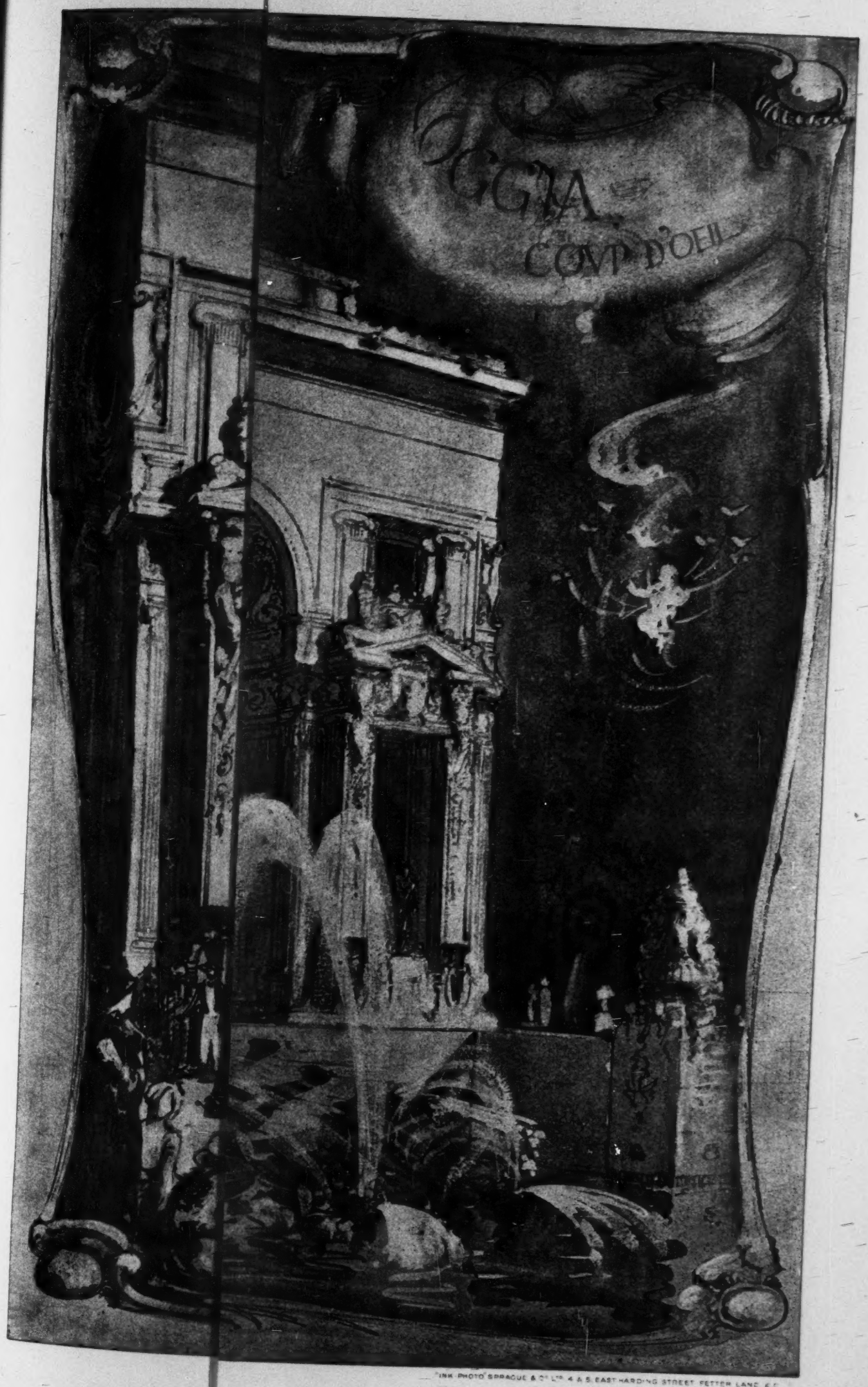

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R.A. Schools, 1910: Travelling St

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Loggia
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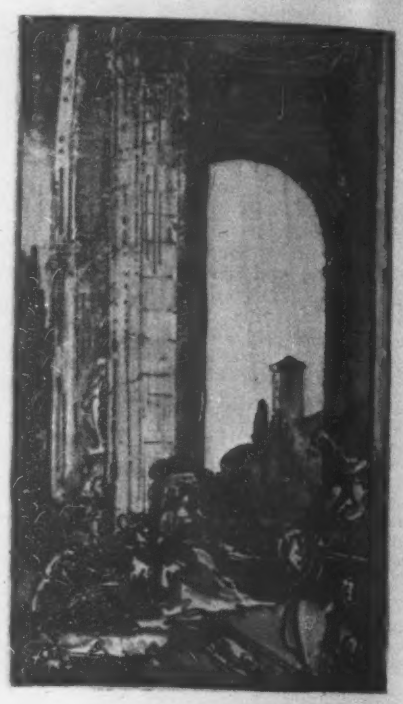
bower, in that which is nearest still to its early use, in these sad days the Loggio are dead. Commerce and Calvinism—twa corbies—have plucked their e'en. Tangled terrace makes their ditch, arch and shadow are their breast-



A Loggia.

plate, arabesque their damascene; sonnets are their vanished valour. Not the Loggia di Lanzi—that's the agora of the Hellene or the atrium of the Roman, not a loggia at all. As well "the Street" in New York City or Threadneedle-street in ours. For these places have their uses, contrary to the precepts of the gods. No, the loggia is private, intimate and undisturbed—its shades and vaulting coloured with the fragrance of the lute. Careless are those who are in it and forgetful of all but themselves. For this is not Olympus, which is more a belvedere. It is like the earliest garden, but nothing like so tiresome. Apex of the centuries—its floor is strewn with only the peel of apples from the tree.

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R.A. Schools, 1910: Travelling Studentship (£60).

A LOGGIA IN

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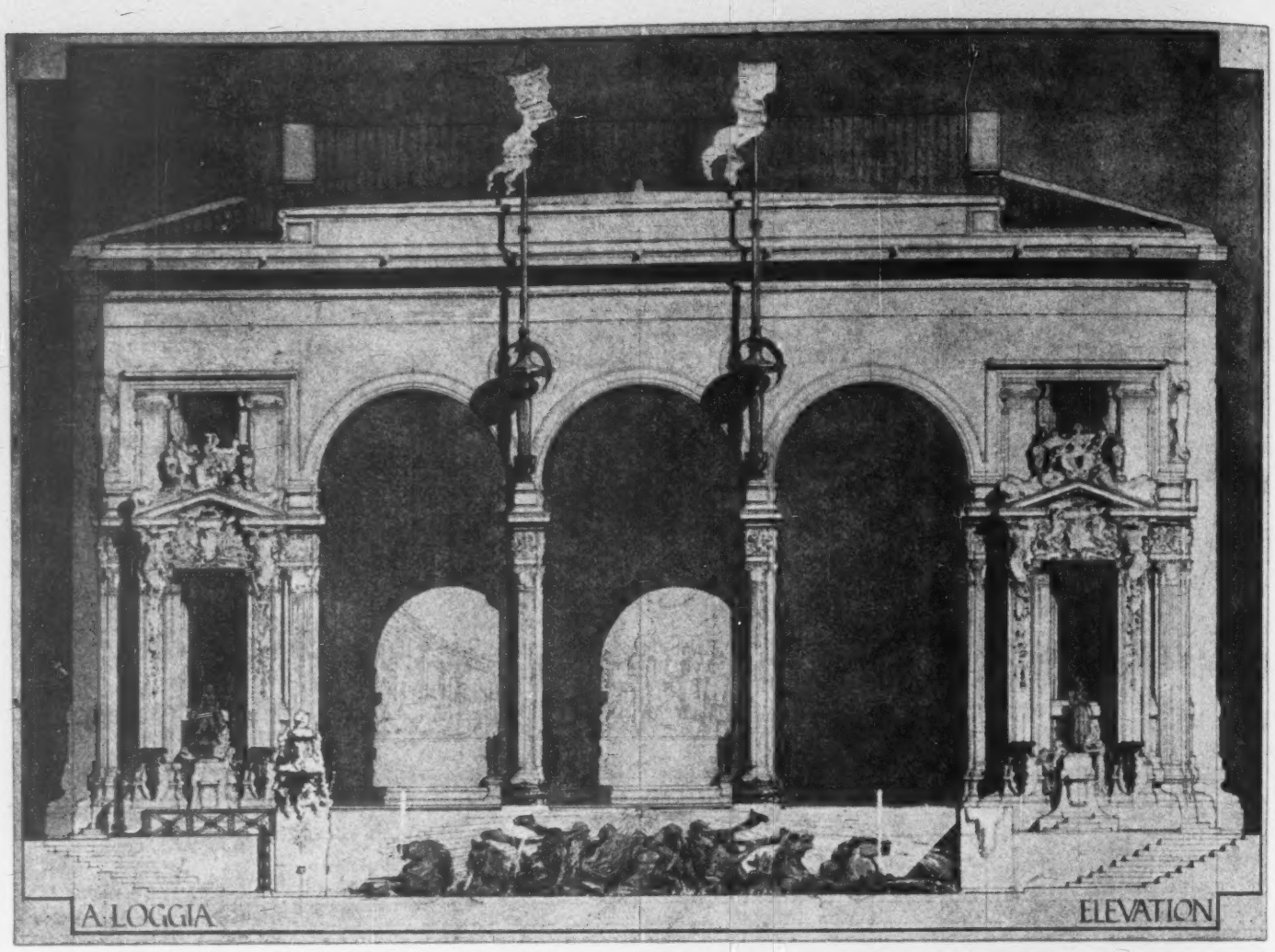
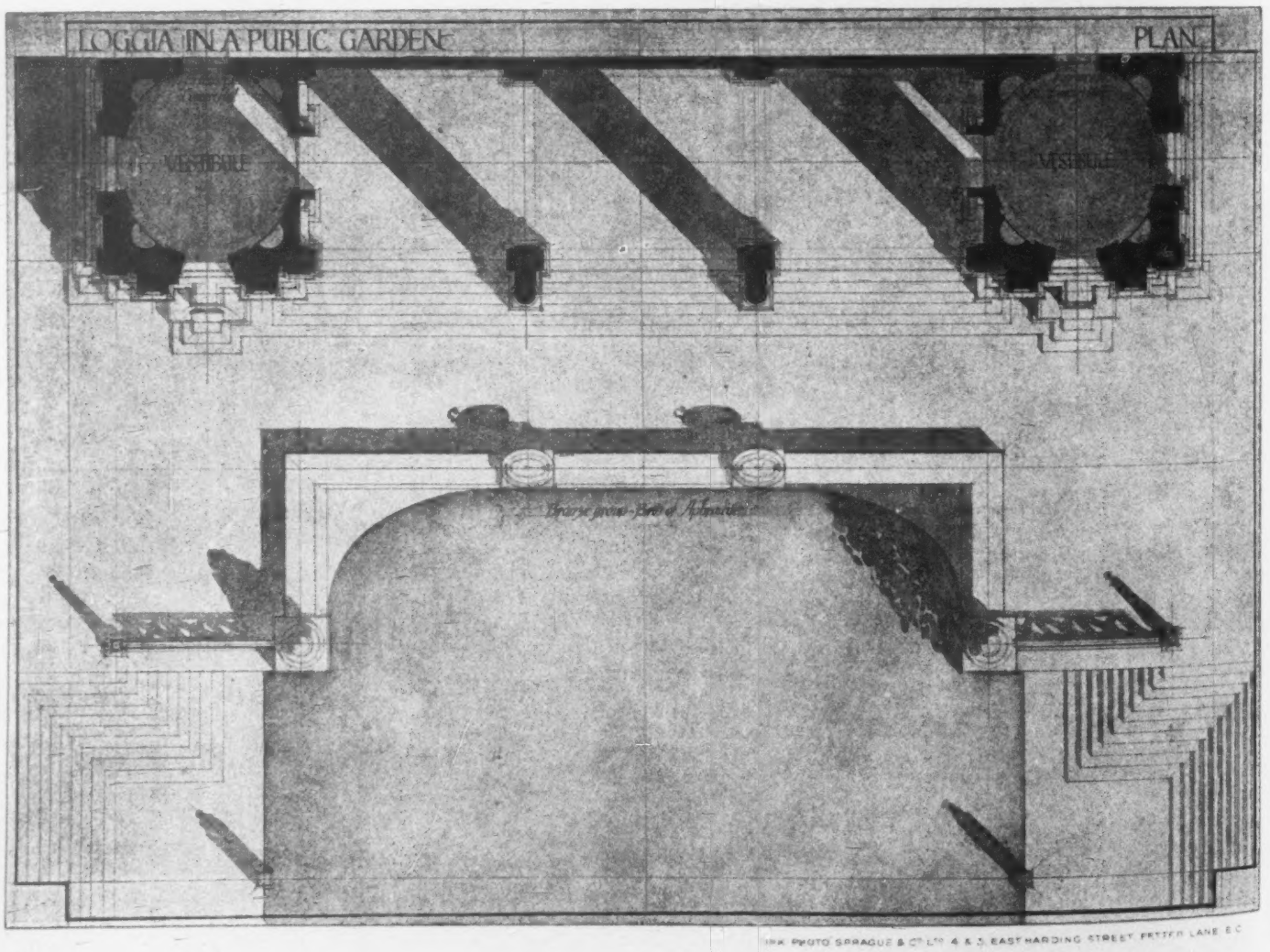
A LOGGIA IN A PUBLIC GARDEN.—By Mr. Adrian Berrington.





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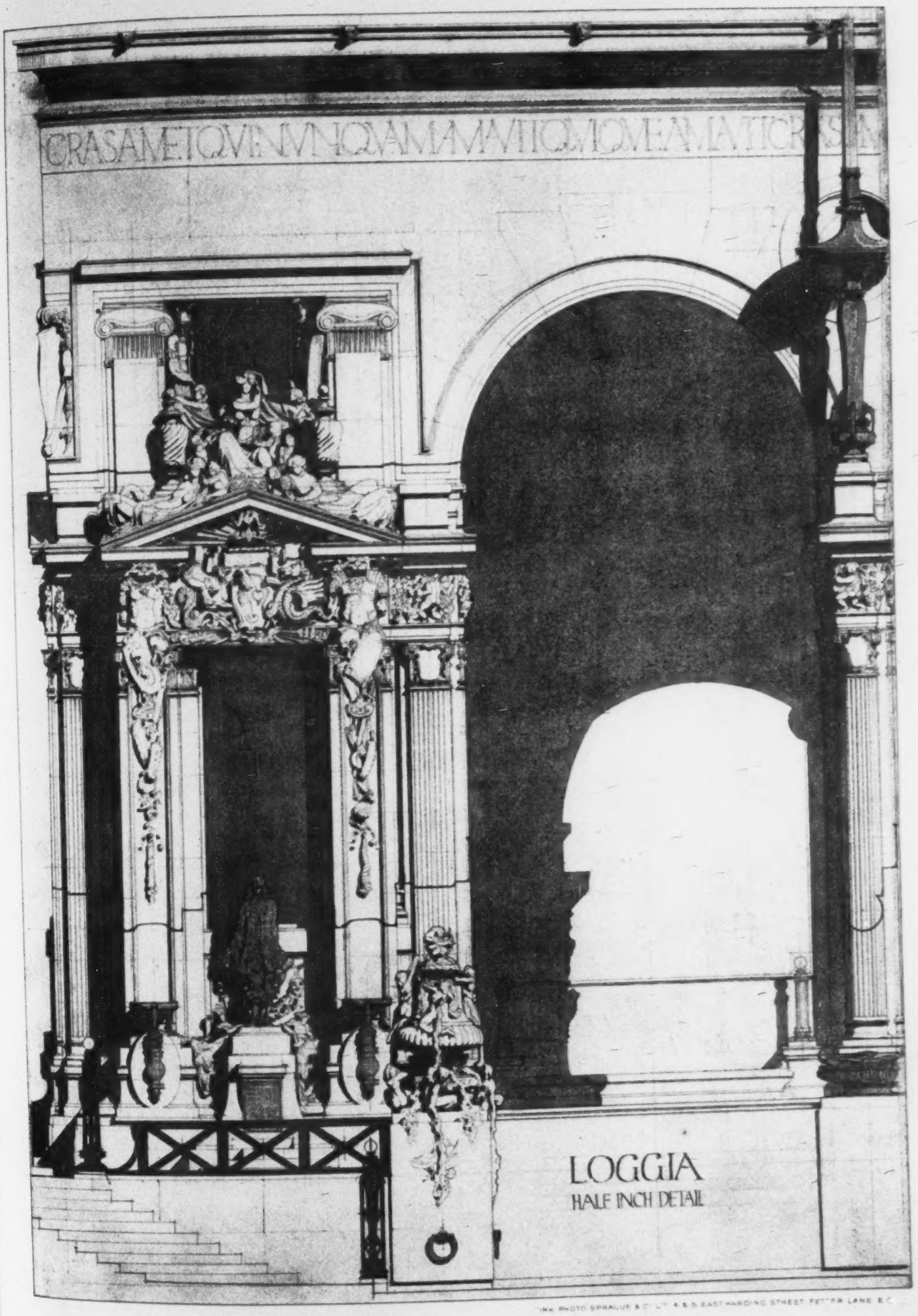

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Royal Academy Exhibition, 1911.

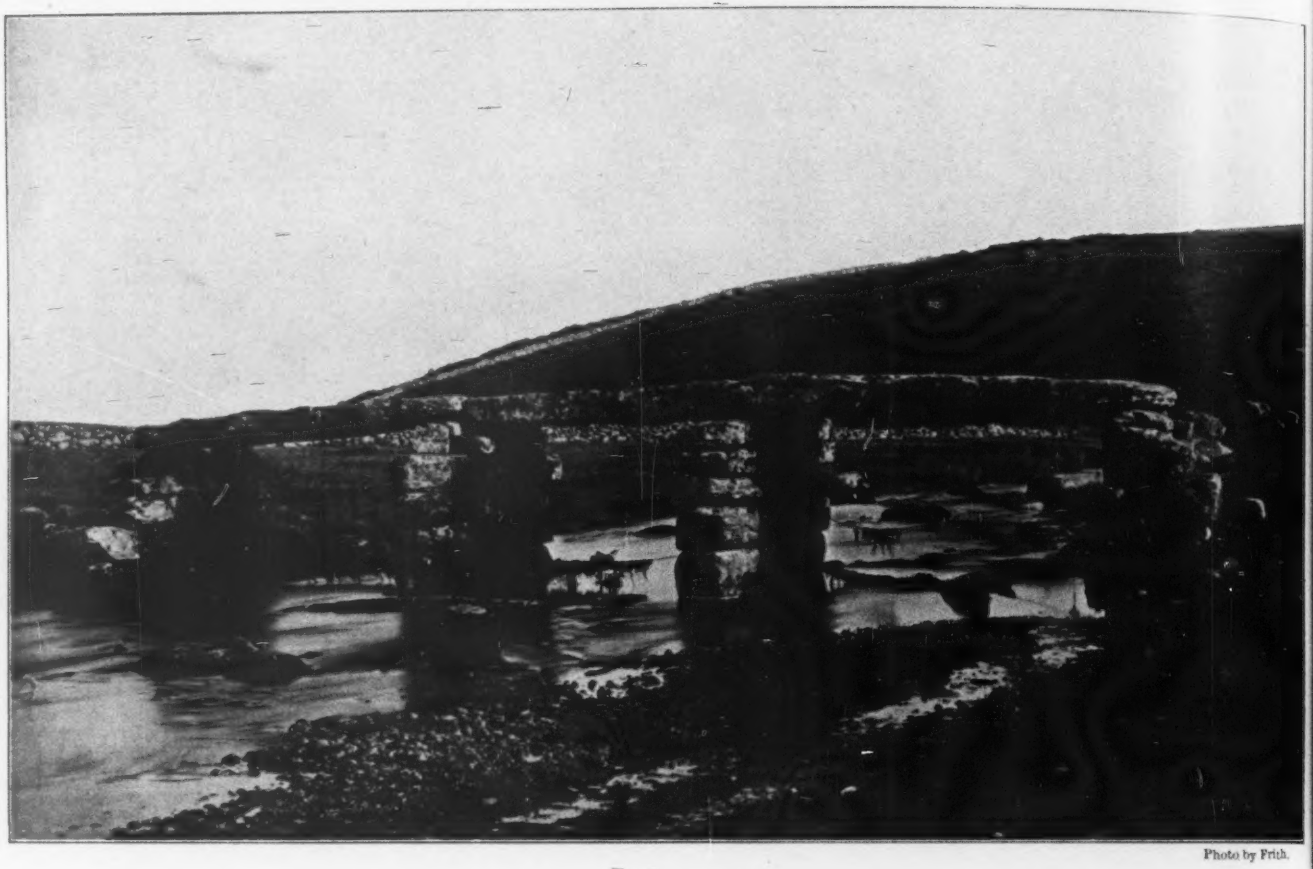
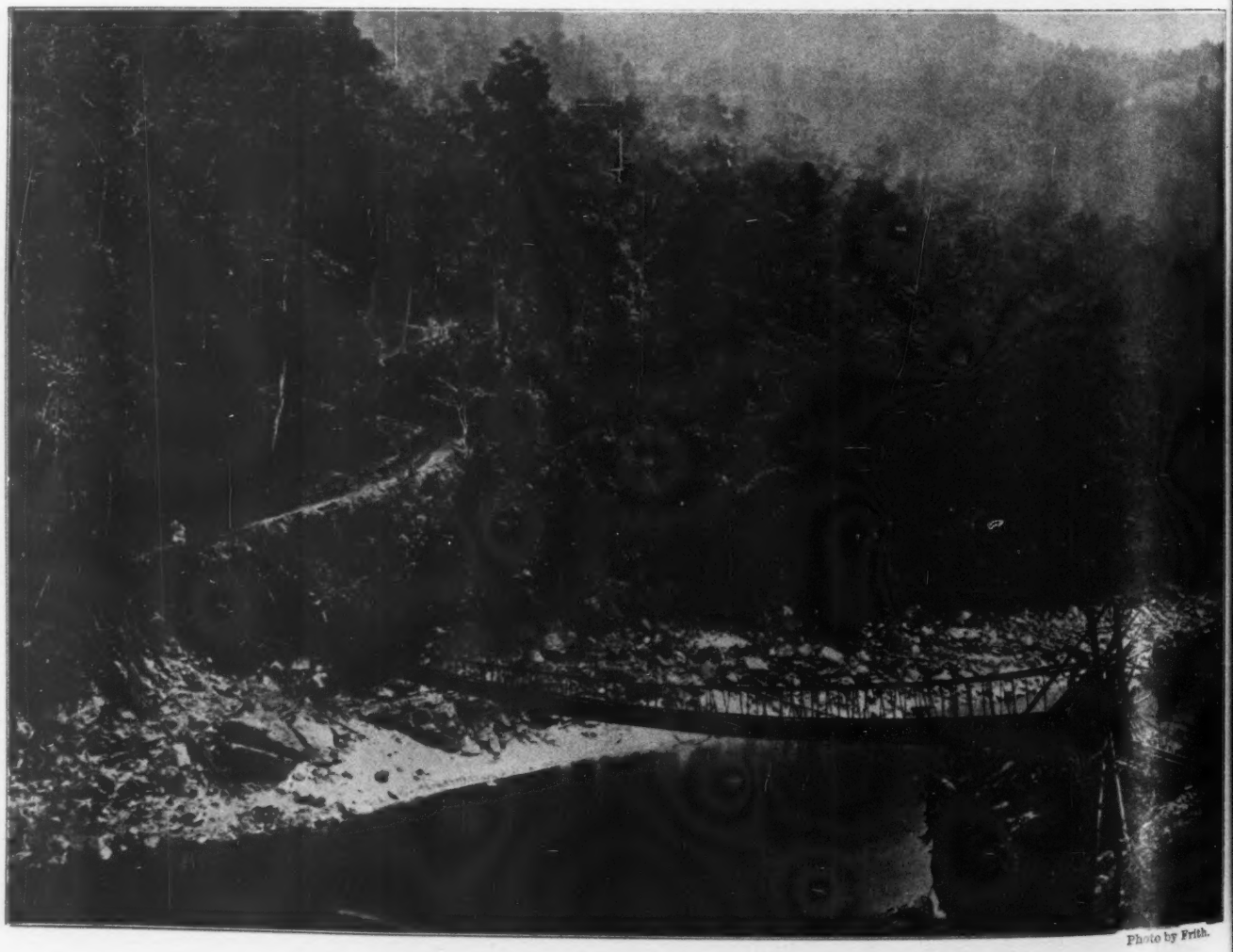


Photo by Frith.

PACKHORSE CLAPPER BRIDGE AT POSTBRIDGE, DARTMOOR.



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BAMBOO SUSPENSION BRIDGE ON THE TEESTA, DARJEELING, INDIA.

Photo by Frith.

THE BRIDGE OF SHOPS, SRINAGAR, KASHMIR.

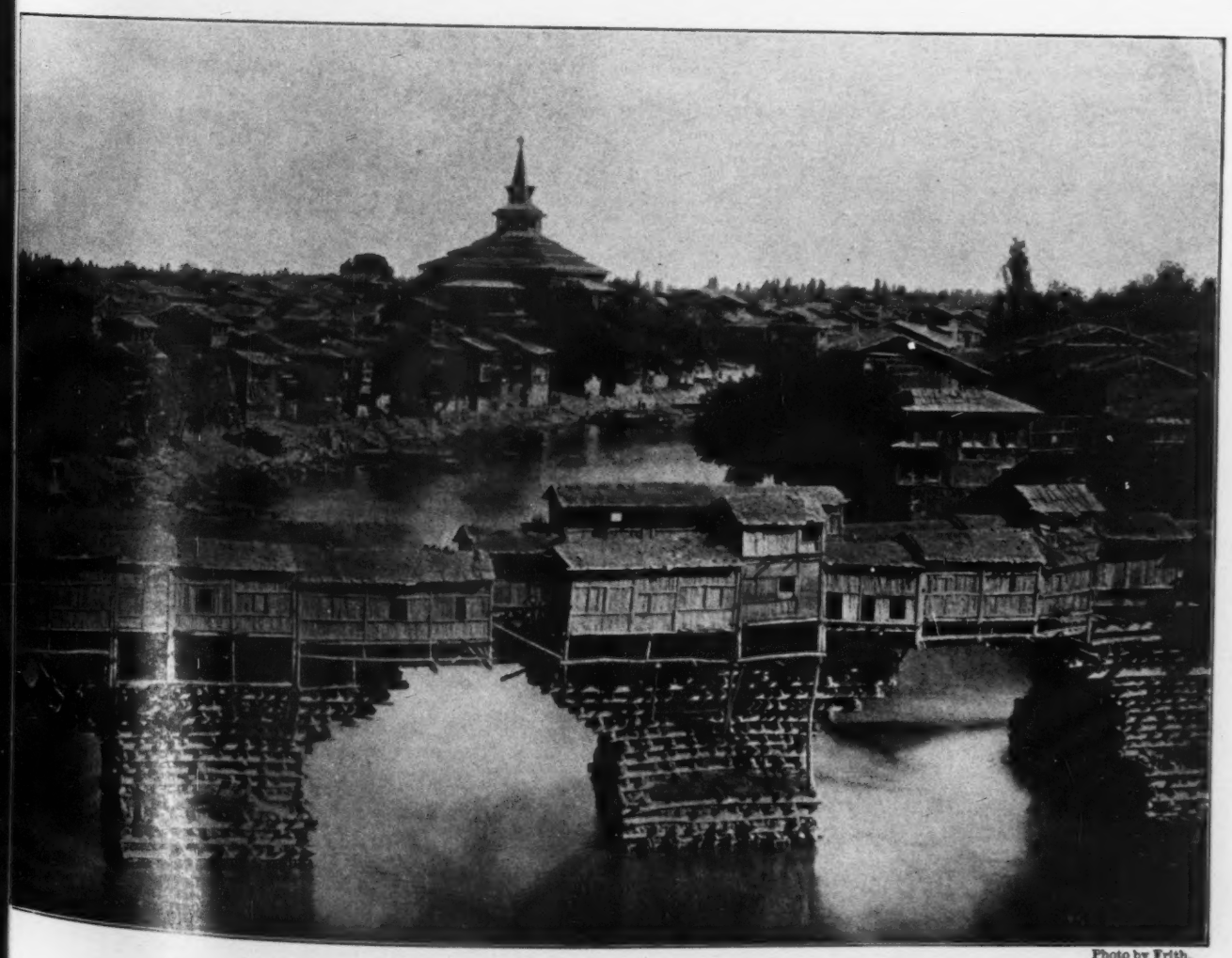

Photo by Frith.

THE BRIDGE OF SHOPS, SRINAGAR, KASHMIR.

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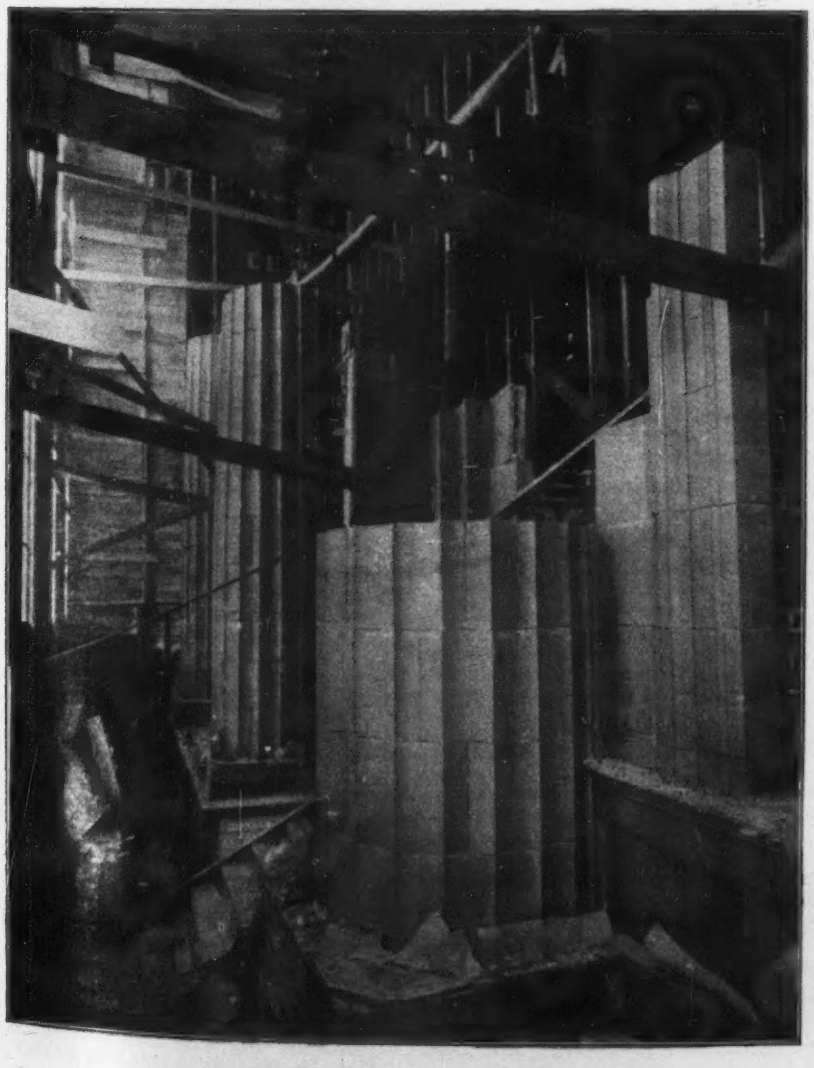
MONTHLY REVIEW · *of* · CONSTRUCTION.

BUILDING IN CANADA.

As an example of the manner in which the rapid development of Canada forces building under difficulties, the illustration on this page is interesting. The building in question is a branch of the Canadian Bank of Commerce at Fort William, Ontario. The principal façade fell to be built in the winter months, and was consequently subject to temperature at times as low as 40 deg. below zero.

In this case the rear and side walls were already built and their openings closed. The area of the front with a due allowance of working space was enclosed by a hoarding to its full height. The permanent heating system was roughed in at an early state, and the building heated by temporarily-placed radiators, with the result that the work proceeded independently of atmospheric conditions. Needless to say, plaster work can be proceeded with by the same means. Conditions do not always call for this system of enclosure. Much work can be done in the open in fairly severe frost. Concrete work is executed, for instance, with the sand, gravel, and water all heated in an old boiler or cylinder, and the resulting work is found to be quite sound, as the cement is set before the materials are sufficiently cooled to freeze.



Canadian Bank of Commerce, Fort William.

Mr. Victor D. Horsburgh, A.R.I.B.A., Architect.

NOTES ON SOME DEFINITIONS USED IN STRUCTURAL MECHANICS—(*Contd. from p.* 45).

By Percy J. Waldram, F.S.I.

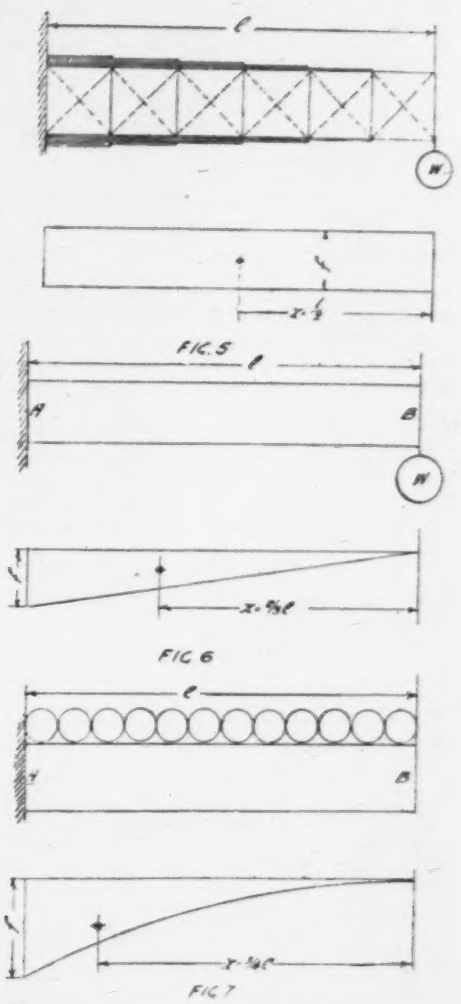
MODULUS OF ELASTICITY AND DEFLECTION.

Cantilever Concentrated Load Uniform Flange Stress.

In the last article (see *Builder*, June 14, 1911, page 45) it was shown that the greatest deflection (Δ) of a cantilever would be correctly expressed by multiplying the area (G) of a diagram of flange stresses by 2 and by the distance (X) of the centre of gravity of that area from the point of greatest deflection, and dividing it by the depth (D) of the cantilever and the modulus of elasticity (E) of the material or $\Delta = \frac{2GX}{ED}$.

This solution can be applied to determine the deflection of parallel beams and cantilevers as follows:—

First, take a cantilever in Fig. 5 with flanges proportioned to give a uniform flange stress. The flange stress diagram will be a rectangle—its area (G) will be fl, its leverage X will be $\frac{1}{2}l$, and $\frac{2GX}{Ed}$ will, in this case, be represented by $\frac{2fl \times \frac{1}{2}l}{Ed}$, or $\frac{fl^2}{Ed}$.



If we want to represent this in terms of load (W), then f = the bending moment ÷ the flange area and depth, or $\frac{Wl}{Ad}$ and the deflection $= \frac{Wl^3}{EAd^2}$

Cantilever Distributed Load Uniform Flange Stress.

If the load W had been distributed then both f and the deflection would be half these values when expressed in terms of W.

Cantilever Uniform Section Concentrated Load.

Next take a cantilever of uniform section as Fig. 6 loaded at one end. The area of the stress diagram in this case will be $\frac{fl}{2}$, the distance of its *c.g.* from B will be $\frac{2}{3}l$ and $\frac{2GX}{Ed}$ will be represented by $\frac{2fl}{3Ed}$, or expressed in terms of the load W; $f = \frac{Wl}{Ad}$, $\Delta = \frac{2}{3}\frac{Wl^3}{EAd^2}$.

Cantilever Uniform Section Distributed Load.

Next take such a cantilever loaded with a distributed load as Fig. 7. In this case the diagram of stress intensity is traced by a parabola. The area of it (obtained from the particulars given in Fig. 8) would be $\frac{2fl}{3}$, the distance of its *c.g.* would be $l\frac{3}{4}$ and $\frac{2GX}{Ed}$ would be $\frac{2fl}{3} \times \frac{3l}{4 \times Ed}$ or

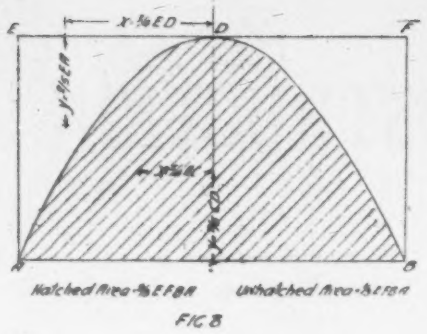


FIG 8

$\frac{6fI^2}{12Ed}$ or $\frac{fl^2}{2Ed}$. f in this case would be $\frac{Wl}{2Ad}$, and the Δ for any distributed load W would be $\frac{Wl^2}{4EAd^2}$.

Obviously the deflection in any kind of parallel cantilever can be expressed in simple terms of load, span, depth, flange area, and the modulus of elasticity of the particular material of which the cantilever is constructed.

Girder Uniform Section Concentrated Load.

Fig. 9 shows a girder under a concentrated load. This may be considered as two cantilevers back to back fixed in the centre against the downward bearing load and loaded with the end reactions of $\frac{W}{2}$, the central deflection being equal to the deflections of either cantilever.

In this case the area of the stress diagram $G = f \times \frac{l}{2} \times \frac{1}{2}$ or $\frac{fl}{4}$. X, the distance of its *c.g.* from the point of greatest deflection *at the bearings*, would be $\frac{2}{3}$ of $\frac{1}{2}l$ or $\frac{1}{3}l$ and $\frac{2\ GX}{Ed} = \frac{2 \times \frac{fl}{4} \times \frac{l}{3}}{Ed} = \frac{fl^2}{6\ ED}$. If $f = \frac{Wl}{4\ Ad}$, then the deflection expressed as before in terms of $W = \frac{WL}{24\ EAd}$.

Girder Uniform Section Distributed Load.

The next case is that of a girder loaded with a distributed load W (Fig. 10). Treating it in the same way as two cantilevers under a distributed load, we attribute the values in $\frac{2\ GX}{Ed}$ as before. G (the area of either half of the stress diagram) $= \frac{2}{3}\frac{fl}{2}$, and the distance of its *c.g.* from A $(X) = \frac{5}{16}l$.

$$\Delta = 2 \times \tfrac{2}{3}\frac{fl}{2} \times \frac{5\,l}{16\,Ed} = \frac{5fl^2}{24\,Ed}$$

In this case $f = \frac{Wl}{8\ Ad}$, so that the deflection in terms of W is

$$\Delta = \frac{5 \times Wl \times l^2}{24 \times 8 \times Ad \times Ed} = \frac{5}{192}\ \frac{Wl^3}{EAd^2}$$

Girder Uniform Flange Stress Distributed Load.

The next case (Fig. 11) is that of a girder with flanges proportioned to the load, giving a uniform flange stress under a distributed load.

The values of $\frac{2\ GX}{Ed}$ will be as follows:—

$$G = fl \qquad X = \tfrac{1}{2}l \qquad f = \frac{Wl}{8\ Ad}$$

$$\frac{2\ GX}{Ed} = \frac{fl \times l}{4\ Ed} = \frac{fl^2}{4\ Ed} \qquad \Delta = \frac{Wl^3}{32\ EAd^2}$$

Girder Uniform Flange Stress Concentrated Load.

It is obvious by inspection that in such a girder under a concentrated load the value of $\frac{2\ GX}{Ed}$ would be the same $\frac{fl^2}{4\ Ed}$, but as $f = \frac{Wl}{4\ Ad}$ then $\Delta = \frac{Wl^3}{16\ EAd^2}$

Each of the seven cases dealt with results in the term $\frac{Wl^3}{EAd^2}$ multiplied by the varying figures 1, $\frac{5}{6}$, $\frac{1}{2}$, $\frac{1}{24}$, $\frac{5}{192}$, $\frac{1}{32}$, and $\frac{1}{16}$, which varying figures may be expressed as a constant C.

In the foregoing deductions the approximation Ad (flange area × effective depth) has been used to express the section modulus for the sake of clearness. This should now be replaced by the more exact expression Z, so that the general formula would read $= \frac{Wl^3}{EZd} \times C$. The term d in this formula would be the full depth in rectangular and other sections which are symmetrical about their neutral axes. In such sections the flange stress f which causes the stretch setting up the initial gradient, is measured in the outermost fibres. For such sections, therefore, the formula can be further simplified, for $Zd = \frac{I}{\frac{1}{2}d} \times d = 2\ I$ and $\frac{CWl^3}{EZd} = \frac{CWl^3}{2\ EI}$, and if the foregoing values of C be halved, a new constant n $(= \frac{1}{2}C)$ can be used with the formula $\Delta = \frac{nWl^3}{EI}$.

The values of n may be tabulated as follows:—

	Uniform Section	Uniform Flange Stress.
Cantilever concentrated load ...	$\frac{1}{3}$	$\frac{1}{3}$
Cantilever distributed load	$\frac{1}{8}$	$\frac{1}{8}$
Girder central load	$\frac{1}{48}$	$\frac{1}{12}$
Girder distributed load	$\frac{5}{384}$	$\frac{5}{96}$

For ⊤ and other sections which are not symmetrical about their neutral axes the formula can be used in the same form. In the form of $\frac{CWl^3}{EZd}$ the depth d would be twice the greatest distance (y) of the neutral axis from the outer fibres.

The fibre stress to which such a beam would be calculated would be that in the extreme fibres at the tip of the web, and the gradient setting up deflection would be determined by the stretch of these fibres ÷ the distance Y. This gradient would be just the same as that determined by the lesser distortion in the fibres at the top of the table ÷ the lesser distance X. But as the lesser fibre stresses in the table of a ⊤ section is not calculated, therefore the lesser distance X is not used. The deflection is, in fact, precisely the same as that of a symmetrical section of a depth equal to $2y$ under the same flange stress, and is, therefore, calculated on precisely the same way. In the practical calculation of beams the flange stress f is almost invariably calculated first, and when this is known the factors of load, section modulus, and bending moment can be disregarded, the deflection being merely determined by the span and depth, or $\Delta = \frac{pl^2}{Ed}$, p being a constant varying with the type of beam and method of loading. E for structural steel can be taken at 13,000 tons, and for a working stress of 7½ tons per square inch the formula can be simplified to—

$$\Delta = \frac{pl^2}{d} \times \frac{7{\cdot}5}{13{,}000} = \frac{pl^2}{D} \times {\cdot}000576,$$

or if S in feet be substituted for l in inches—

$$\Delta = \frac{pS^2}{d} \times {\cdot}083$$

p can be tabulated as follows:—

Value of p in formula $\Delta = \frac{pS^2}{d} \times 0{\cdot}083$.

Beam and Load.	Detail of Beam. Uniform Section.	Uniform Flange Stress and Depth.
Cantilever concentrated load ...	$\frac{1}{3}$	1
Cantilever distributed load	$\frac{1}{8}$	1
Girder concentrated load	$\frac{1}{6}$	$\frac{1}{2}$
Girder distributed load	$\frac{5}{48}$	$\frac{5}{12}$

Handy Formula for the Deflection of Wooden Beams.

If a rectangular beam of clean deal 1 in. broad and 1 in. deep be placed over a span of 1 ft. and loaded centrally with a weight of 1 lb., the deflection will be found to be in the neighbourhood of ·0003 of an inch. Any increase in breadth would decrease the deflection directly, and any increase in depth would decrease it according to the cube of such increase in depth.

If the load be distributed by applying it in the shape of flexible strips of lead the deflection for a 1-lb. load over a 1-ft. span would be about 0·0002, for a 2-ft. span 0·0016, and for a 3-ft. span 0·0054, etc., and any alteration of breadth and depth would have the same effect as in the case of the concentrated load. It is possible to obtain very useful handy formulæ from the results of these experiments.

In everyday practice it is very frequently necessary to know for wood beams what is the load in hundredweights either concentrated or distributed which will cause a deflection not exceeding $\frac{1}{40}$ in. per foot of span or $\frac{1}{480}$th—the deflection which is usually considered to be sufficient to crack plastered ceilings.

This limit of deflection for a 1-ft. span would be represented by $\frac{1^2}{480}\ S$ or 0·021 S. With a beam 1 in. in breadth, 1 in. in depth, and 1 ft. in span, a deflection of 0·002 was caused by a distributed load of 1 lb. Had the load been 112 lb. the deflection would have been about ·0224 in. In other words, for a unit span of 1 in feet, a unit breadth of 1 in inches, and a unit depth of 1 in inches, a unit distributed load of 1 in hundredweights causes a deflection of approximately $\frac{1}{40}$ in. per foot of span.

For any beam of clean fir, therefore, it can be assumed that the distributed load in hundredweights which will produce a deflection of $\frac{1}{40}$ in. per foot of span will be expressed by $\frac{bd^3 \text{ in inches}}{S^3 \text{ in feet}}$.

For concentrated central loads the results should be multiplied by $\frac{2}{3}$, and for hard woods the deflection may be taken for practical purposes as the same as deal.

The above handy formula can be further extended. We have ascertained that the load in timber beams which causes a deflection of $\frac{1}{40}$ in. per foot of span can be shortly put as $W = \frac{bd^3}{S^3}$, and we can similarly use the

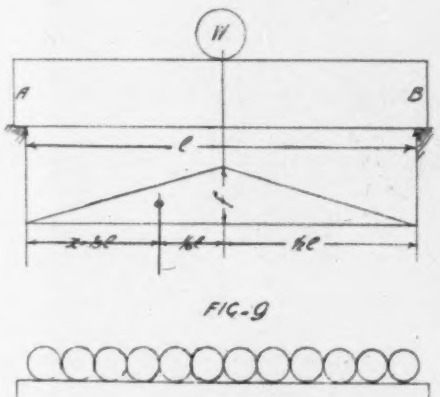


FIG. 9

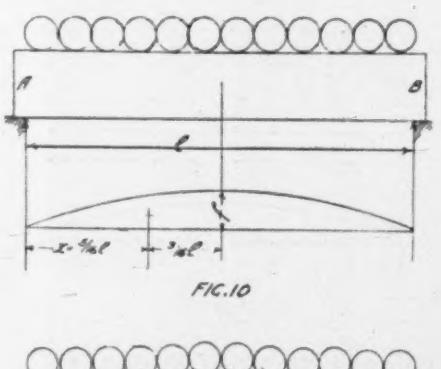


FIG. 10

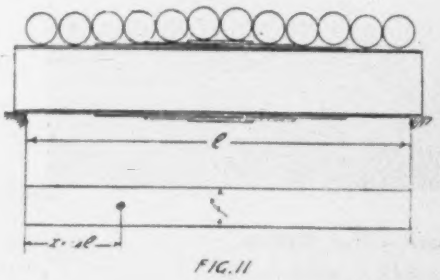


FIG. 11

results of experiments to determine the deflection of a timber beam under any load. Our model beam deflected ·03 or $\frac{1}{33}$ in. under a concentrated load of 1 cwt. in a span of 1 ft., and ·02 under a distributed load. Obviously, therefore, to obtain the deflection in any beam we have merely to regard the conditions, *i.e.*, breadth and depth in inches and span in feet of our beam in the experiment as unity and multiply by the relation $\frac{bd^3}{S^3}$ the deflections of $\frac{1}{30}$ in. per hundredweight of load for beams under concentrated load, and $\frac{1}{30}$ in. for distributed load.

If instead of beams we had cantilevers, we can easily use the same experimental results and increase the figure of $\frac{1}{30}$ in. by the relation between the deflections of girders and cantilevers shown in the table. Thus the deflection of a cantilever 1 in. × 1 in. × 1 ft. span under a concentrated load of 1 cwt. would be to the deflection $\frac{1}{30}$ in. for a beam of the same section and load in the proportion of $\frac{3}{2}$ to $\frac{1}{24}$, or would be $\frac{1}{30}$ in. × $\frac{3}{2}$ ÷ $\frac{1}{24}$ or $\frac{1}{10} \times \frac{3}{1} \times \frac{24}{1} = \frac{72}{10}$ in., say $\frac{1}{7}$ in.

It is, however, in practice more convenient to know what deflection is going to take place in a timber beam loaded to the extent of the handy formula for timber beams safe distributed load in hundredweights = $\frac{bd^2 \text{ in inches}}{S \text{ in feet}}$.

Under these circumstances, assuming the modulus of elasticity for large scantlings to be 9,000 cwt. per square inch and f to be 9 cwt. per square inch, which is the safe f assumed in that formula, then

$$\Delta = \frac{5}{24}\frac{fL^2}{ED} \text{ L in inches} = \text{S12 in feet.}$$
$$= \frac{5 \times 9 \times 12S \times 12S}{24 \times 9{,}000 \times d} = \frac{S^2}{30d}$$

So that for wood beams loaded with the safe distributed weight allowed by the handy formula (or any other arrangement of weight involving a flange stress of 9 cwt. per square inch) the deflection can be calculated from the very simple formula $= \frac{S^2}{30d}$. If a modulus of 10,800 be assumed, the formula becomes $\frac{S}{40d}$.

Limiting Ratio of Depth to Span for Given Ratios of Deflection to Span.

It is often convenient in practical design to determine the limiting proportion of depth to span which will keep deflection within defined limits. For fir timber beams and joists under distributed loads the limit of deflection usually fixed is $\frac{1}{450}$ in. per foot of span of $\frac{1}{450}$, and the material is almost invariably calculated for an f of 9 cwt. per square inch. Assuming a modulus of 10,800 cwt. the deflection in such beams,

$$\Delta = \frac{5}{24}\frac{fl^2}{Ed}, \text{ and when this is } \frac{1}{480}l,$$
$$\text{then } \frac{l}{480} = \frac{5 \times 24 \times 9}{24 \times 10{,}800} \times \frac{l^2}{d},$$
$$\text{or } \frac{l}{d} = \frac{10{,}800 \times 24}{480 \times 5 \times 9} = 12$$

or depth in inches = span in feet. Which is obviously much more than experience has found necessary.

In this connexion it should be recollected that ceilings are cracked not by the deflection due to the *total* load, but by that portion of it which is represented by the superload. The deflection due to structural load is constant and permanent from the time the structure is completed. When the superload is about half the total load—the old rule for floor joists—depth in inches = half span in feet + 1 would be correct.

For rolled joists or steel girders as beams under distributed load with uniform flanges working to a stress (f) of 7½ tons per square inch and using steel possessing a modulus of 13,000 tons,

$$\Delta = \frac{5}{24} \times \frac{fl^2}{Ed} \text{ and when this is } \frac{1}{480},$$
$$\text{then } \frac{l}{480} = \frac{5 \times 7{\cdot}5}{24 \times 13{,}000} \times \frac{l^2}{d}$$
$$\frac{l}{d} = \frac{24 \times 13{,}000}{480 \times 5 \times 7{\cdot}5} = 17{\cdot}5.$$

The limiting deflection of rolled joists is more frequently taken at about $\frac{1}{360}$, under which conditions the ratio $\frac{l}{d}$ would be about 24 or *depth in inches = half span in feet.*

Before leaving the subject of deflection it is necessary to note one practical point with regard to cantilevers. It will be found that these often show a deflection greater than is expected. This is because the formula assumes that one end of the cantilever is fixed; but absolutely fixed ends are in ordinary building work almost impossible, and a very slight yielding of the material anchoring the short arm may mean a considerable drooping of the end of the long arm. Take the case of a cantilever 12 ft. long built into a wall with plates top and bottom, and so arranged that the effective centre of the top plate carrying the counterweighting masonry is 18 in. from the front edge of the bottom plate upon which the long arm would tend to rotate. If the top plate moved upwards under the action of the load and compressed the counterweight of masonry to the extent of $\frac{1}{16}$ in., the long arm would drop eight times as much, or ½ in. in addition to the elastic deflection. In the case of a cantilever which is a prolongation of a

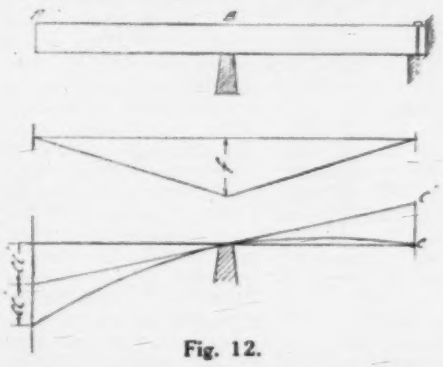


Fig. 12.

girder over one of the bearings, the fixing of the cantilever is obviously flexible. In the case of a cantilever loaded with a distributed weight and counterweighted by means of such a girder similarly loaded and of the same span, as in Fig. 12, the deflection is just double the normal, the difference being due to the flexibility of the counterweighting arm.

Cases necessitating the exact calculation of the deflection of balanced cantilevers do not often arise in architectural practice, cantilever arms being usually kept short; but, if necessary, simple methods of calculating them will be found in Professor T. Claxton Fidler's well-known book on "Bridge Construction."

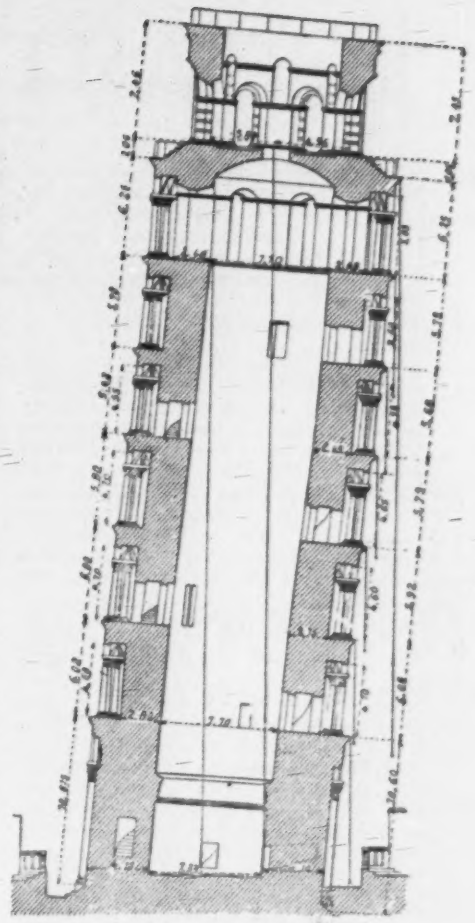
THE TOWER OF PISA.

IN consequence of representations made relative to the stability of the Tower of Pisa the Italian Government last year appointed a Commission to inquire into the actual condition of the structure and to compare the results ascertained with those obtained in 1817 by Cresy and Taylor and in 1859 by Rohault de Fleury.

Measurements taken by the Commission show that the projection of the seventh cornice beyond the first cornice is 2·868 metres, the inclination of the axis being 3·248 metres for the total height of the tower.

According to the measurements made in 1817 by Cresy and Taylor, the inclination of the axis was 3·053 metres. Therefore, if both sets of measurements are accurate, the summit of the tower has moved through the space of 195 millimetres, or nearly 8 in., during the past ninety-three years.

Again, the observations by Rohault de



The Leaning Tower of Pisa.

(From *Genie Civil.*)

Fleury in 1859 showed the inclination to be 3·180 metres, representing an increase of 127 millimetres since the investigation forty-two years earlier, and giving 68 millimetres as the movement during the succeeding period of fifty-one years.

Thus we get the mean annual increases of inclination of 3 millimetres for the period 1817-59, 1·3 millimetres for the period 1859-1911, and 2·1 millimetres for the period 1817-1911.

Of course, it would not be safe to draw any inferences from the figures quoted unless first satisfied that all of them were absolutely reliable, a matter concerning which there is reason for doubt. The original report and drawings by Cresy and Taylor are not to be found to-day, and the only drawing at the disposition of the Commission was the copy of a section of the tower made in 1831 by Raniere-Grassi from the original of Cresy and Taylor. From this section it appears to be clear that the measurements taken by the two architects mentioned were taken in a direction not exactly agreeing with the maximum inclination, but at a vertical section making an angle of 5° 31′ with the section of maximum inclination.

Consequently, comparison of the latest records with those of previous dates is of no practical utility, and we have no means of judging whether the inclination of the tower has changed or remained constant during the past century.

It is generally admitted to-day that the tower was originally intended to be vertical, but that after its commencement in 1174 subsidence took place, giving rise to the inclination which has made the tower not only a curiosity, but also an instructive object-lesson in building construction. Various discoveries by Rohault de Fleury show the accuracy of this view, one being the presence of a gargoyle at first-floor level, the channel of which is at an angle opposed to that of the outward flow of water, and another the evidence of attempts made to correct the inclination of to tower by increasing the height of six successive stories at the gradually-sinking side. According to De Fleury, the differences of height for the stories in question are 3, 4, 7, 14, 8, and 9 centimetres respectively, and it is interesting to recall the fact that the same kind of artifice has been adopted at

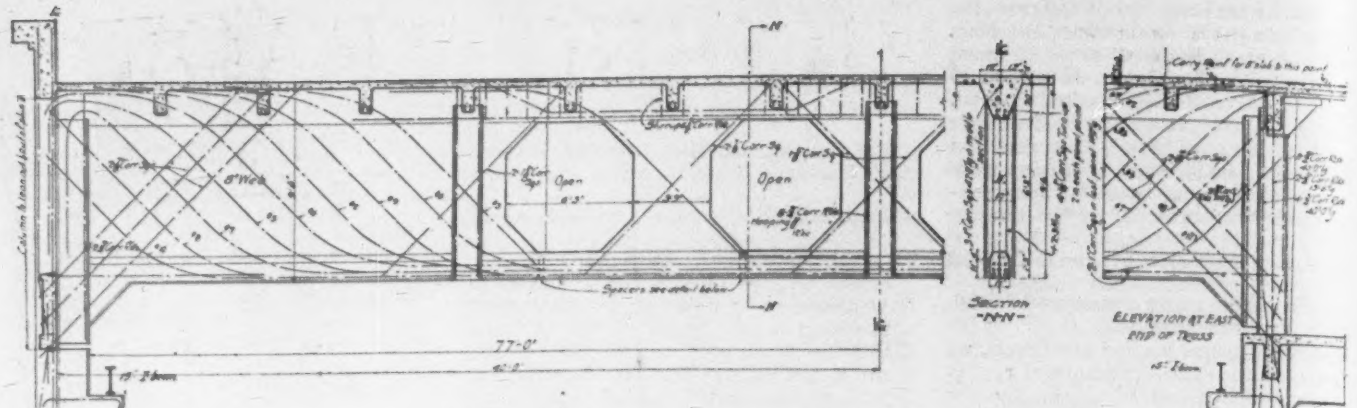


FIG. 1—SIDE ELEVATION AND CROSS SECTION OF 80-FT. GIRDER AT THE HOOD RUBBER COMPANY

(From *Cement Age*.)

other places in Italy with the object of correcting the inclination of towers which, like that of Pisa, were built during successive epochs.

Borings made under the direction of the present Commission have proved that, contrary to hitherto prevailing views, the tower was not founded upon a solid cylindrical masonry base but upon a masonry ring 3 metres thick beneath the circular wall of the tower, and now having the same inclination as the first floor of the structure.

The most satisfactory conclusion drawn by the Commission is that, as no sign of recent movement exists, the stability of the tower is not endangered. However, a series of bench-marks has been established by means of which it will be easy to follow any deviations of the axis which may occur in future years.

REINFORCED CONCRETE GIRDER OF 80-FT. SPAN.

IN a new factory at Watertown, U.S.A., the flat roof of the main building is carried by reinforced concrete girders, 80 ft. long by 9 ft. 6 in. deep, spaced at intervals of 20 ft. apart. The object of employing members of this exceptional span was to obviate the use of interior columns, which would have interfered with the operation of a travelling crane extending across the building.

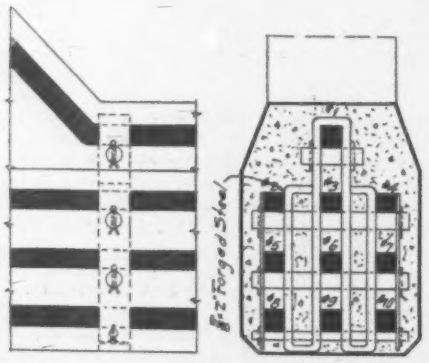


FIG. 2—DETAIL SHOWING SPACER TO HOLD STEEL BARS IN POSITION IN THE 80-FT. GIRDER.

(From *Cement Age*.)

Fig. 1 is a side elevation and cross-section of a typical girder, the weight of which was kept down by the hexagonal openings shown, which in the girder at one end of the building are utilised for the insertion of windows. Fig. 2 shows the arrangement of the bars in the tension boom, and the spacing clips employed to hold the bars in the predetermined positions.

Owing to the unusual length of the girders the reinforcing bars were specially rolled in 100-ft. lengths, so as to avoid joints in the metal. The main tension reinforcement consists of ten 1¼-in. square bars, and diagonal reinforcement is provided by ⅝-in. square corrugated bars arranged in pairs on each side of the centre line. To provide resistance to shear at the ends of the girder, three ⅞-in. square corrugated bars are carved down diagonally as represented in Fig. 1.

The whole of the reinforcement is of high carbon steel, the working stress having been taken at 20,000 lb. per square inch. Details are given in Fig. 3 of the moulds used in forming the girders, which, together with the building itself, were constructed by the Aberthaw Construction Company, of Boston.

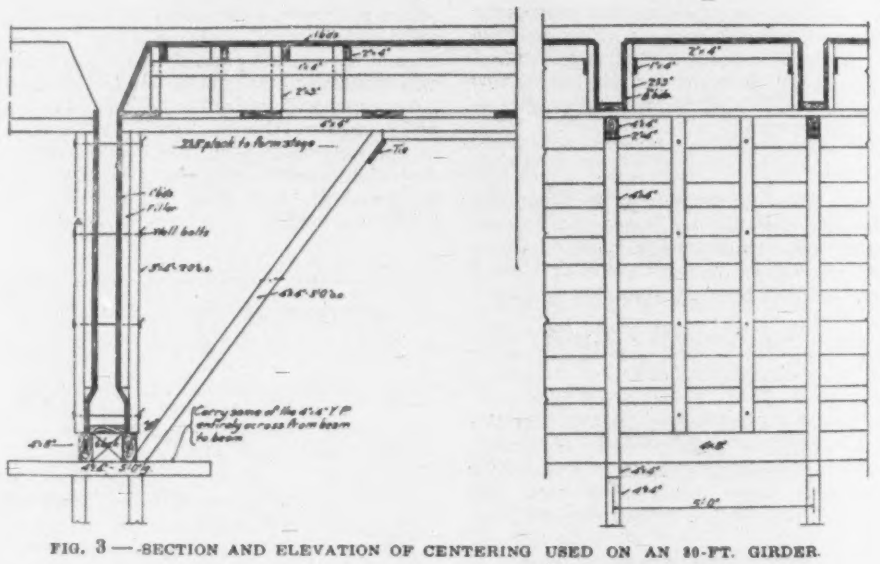


FIG. 3—SECTION AND ELEVATION OF CENTERING USED ON AN 80-FT. GIRDER.

CONSTRUCTION NOTE.

Treatment of Exposed Concrete Surfaces.

THE subjoined notes are taken from specification clauses prepared by Mr. H. H. Quimby and adopted by the National Association of Cement Users (U.S.A.):—

Moulds.—For all surfaces of concrete intended to be exposed the face of the moulds shall be straight, smooth, evenly matched, and watertight, and made so as to be removable without injury to the concrete. Any offsets at joints shall be dressed off flush, and any openings or knotholes shall be caulked with some stiff, plastic material, such as clay mixed with plaster of Paris or sand. The interior of the moulds shall be treated with petroleum or other water repellent to obviate adhesion between the concrete and the wood.

Depositing Concrete.—The concrete should be wet enough to flush, and be spaded against the face of the mould. The spade is then to be used to push the aggregate forward, care being taken to obtain uniformity of mixture and texture at the face. Concreting shall be continuous throughout definite stages of the work, so that joints shall be at the line of some structural feature, or be made truly straight and level.

Scrubbing Surface.—While the concrete is friable or pulverable, the face boards shall be carefully removed and the concrete surface scrubbed with ordinary fibre brushes with a light stream of water from a hose, until the aggregate is exposed to uniform degree and then rinsed off with water and kept moist for several days. If the concrete has set too hard, wire brushes, followed by fibre brushes and rinsing, may be used. Any voids and similar defects shall be patched with concrete of the same mixture immediately after scrubbing, using the hand or a wooden float—not a steel trowel—for applying and smoothing the patches. After they are sufficiently set—say within from five to twenty-four hours—all patches shall be scrubbed to the same texture as the general surface, and be rinsed clean and kept moist for several days.

THE BUILDING TRADE.

AUSTRALIAN BUILDING AND LABOUR NOTES.

THE New South Wales Government has embarked upon a scheme for the manufacture of bricks. An area of twenty-two acres has been secured in a suburb of Sydney, which, it is presumed, will produce fifty millions of bricks per acre. The construction of the kilns is under way, and forty-five workmen employed. Several improved square-end Hoffman kilns are being installed, and seven brick-making machines are being put in, and an output of 300,000 bricks per week is promised in the immediate future.

One of the reasons why the New South Wales Government is undertaking the manufacture of bricks upon a large scale is in order to combat a brick combine which, it is alleged, exists in Sydney, for the purpose of keeping up prices and pressing out smaller competitors. The present prices of bricks in Sydney is about 40s. per 1,000 at the kiln. The Manager of the Government Brick Works says he considers 19s. or 17s. 6d. per 1,000 a fair price, and then he will be able to supply bricks at these figures.

The State Government is not going to limit its enterprise to brick-making only. The Minister for Works says that it is his intention to undertake building, and establish a thoroughly-equipped building yard. He will then be able to compete with any builder in Sydney. He says that the present difficulty he experiences is to get a suitable man to take control of the work. The salary (1,000*l.* a year) is not sufficient to induce any one of the leading Australian builders to take the position. Several have been sounded. Their replies have been to the effect that they are now making 3,000*l.* or 4,000*l.* a year. Under the circumstances, the Minister says if a suitable man cannot be obtained in Australia at 1,000*l.* or even 1,500*l.*, he will be compelled to go to England or America for a man.

There is no question that the labour legislation in Australia has in view making the country a close preserve for workmen already there. Not only is every obstacle put in the way of the workmen abroad becoming familiar with the high wages and comparatively easy conditions ruling there, but efforts are made to prevent boys becoming tradesmen. Journeymen painters, for instance, in a claim now being considered before the Painters' Wages Board, at Sydney, asked that only one apprentice be allowed to every six journeymen painters employed by any one employer.

How the union came to base this demand for this limitation was shown in argument at the first sitting of the Wages Board, which took place last month. The Secretary of the union said that the basis was on the assumption that the average painter now at the trade would live thirty years. One boy turned out every five years in a shop employing six journeymen would mean that there would be six apprentices at the end of thirty years to replace the six workmen. It was pointed out by the Chairman that this proportion would be quite insufficient. In the first place, the average life of painters at various ages at any one time would be considerably under thirty years, and nearer fifteen years. The union also assumed that every man entitled to apprentices would take the proportionate number allowed, that every apprentice would remain at the trade, that no apprentice would die, and that there would be no increase in population in Sydney. As these assumptions are erroneous, it can easily be seen that the limitation of one in six would mean that in thirty years there would be only half the present number of journeymen.

All unions, however, do not take such narrow views in regard to the matter of competition. The Secretary of the Journeymen Plasterers' Union recently announced in the daily papers that his union did not discourage journeymen plasterers coming to Australia. He said there was more work than the existing number of tradesmen could cope with. This union welcomed English plasterers so long as they were good tradesmen. The Bricklayers' Union also said through its Secretary there was plenty of work at Sydney for bricklayers for many years to come. The difficulty experienced was to obtain supplies of bricks, notwithstanding the fact that brick kilns were working high pressure and several new kilns had recently been put into operation.

The building of a church measuring 65 ft. by 52 ft. and 35 ft. high was started and completed in one day at Preston Victoria, on March 27 last. The structure had weatherboard walls and galvanised-iron roof. The whole of the work was carried out by a large staff of carpenters, plumbers, and painters, all of whom gave their services gratis. The suggestion of completing the church in one day was made by a clergyman connected with the Associated Churches of Christ, who before he became a clergyman had been a carpenter. The carpenters got a start early, and the plumbers followed them and commenced operations by 2.30 p.m. Between that hour and the evening of the same day the spouting, down pipes, galvanised-iron roof, and gas fittings were in position, and the painters also carried out their part of the work. The church was ready for divine worship on the following day.

There is great divergence in materials used for building in various parts of Australia. It is not always easy to account for the differences apparent, except that the fact that people get accustomed to particular styles of materials and are disinclined to change. The availability of materials is also in consideration. Before the heavy duties placed on timbers the wood house had a distinct advantage over the brick house in Australia. Now, owing to the Customs duties imposed on imported timbers, the cost of wood houses has increased considerably, and in the case of a five-roomed house there is generally not more than 60*l.* difference in favour of the wood house.

Except for the risk of fire, the extra cost for insurance, and the extra cost of painting and keeping in repair, the wood house, as far as Australia is concerned, makes a satisfactory dwelling. It is cool and attractive, and the cost of material and labour entailed in its construction being less, there is less temptation to skimp the size of rooms.

Roughly, there are two classes of wood houses generally built in Australia. One is the weatherboard house, with the galvanised-iron roof. All outside, excepting the roof, is usually painted. The other style is a variation of the half-timbered Elizabethan house. It has hardwood framing, and tongue and groove timber weatherboard or rough-cast walls, with slate, tile, or shingle roof.

The use of shingles in Australia for roof or walling is not uncommon. The class of shingles used are usually either oak or American redwood. Oak shingles are left unfinished. They weather to a pleasing grey tone. The redwood is usually stained green or brown. For purposes of roofs, shingles are more costly there than either slate or tiles, and are only used to give a homely or distinctive look to private houses.

IS EXTERNAL POINTING IN BRICKWORK DOOMED?

IN all the treatises on building construction very lengthy descriptions are given of the various kinds of pointed joints in brickwork, and the advantages and disadvantages of each, but there is always a warning against building brickwork or pointing in frosty weather. The use of mortar in frosty weather has in some cases been continued by mixing sugar with it, and satisfactory results are said to have resulted.

The warning against frost, however, would have struck Gilbert as a useful idea if he could ever have been able to employ it literally, for why caution the builder against something he cannot prevent. His work, sooner or later, will have to stand the test of frost as well as time. If the mortar will not stand frost whilst it is wet, then, although it dries and hardens, water can still enter through the absorbent bricks.

Bricks, unless they be of the pressed, hard-burnt vitrified type, such as Staffordshires, will absorb moisture, rain will soak well into porous sand-faced bricks, and then the mortar is attacked internally as well as externally. The so-called weather-struck joint, with its nice slope, retains more water than a plain flush vertical joint; besides, wherever there is a crevice water will accumulate. Instead of the water running or trickling down the surface of the joint, some of it creeps upward, and the other only soaks into the brickwork underneath the joint.

Unless, therefore, both the mortar and bricks be hard the water will enter, and it is only a matter of time and disintegration must take place. This is very apparent to everyone, for it is necessary to repoint brickwork every few years to keep it smart in appearance.

Mechanical brickwork, like mechanical lettering, has no beauty, except, perhaps, a statistician be the judge, for although a straight line—or a few straight lines judiciously congregated as in a cornice—be a thing of beauty, innumerable straight lines mathematically arranged with others at right angles tire the eyes, lacking sympathy.

Many of our large industrial towns owe their lack of beauty to this very fact, and the sausage-machine-like turn-out of the endless rows of houses. The sharp, clear-cut edges of the Victorian type of machine-made red bricks added to this unpicturesqueness, and even where that was lacking the various forms of false jointing of the patch-as-patch-can type brought about the same results.

The sole aim and object of the brick manufacturer seemed to be to get the maximum size of brick allowable within the statute limit for taxation, which, combined with the proportions of breadth and thickness for proper bonding, gave the universal size of the bricks employed.

The use of hard bricks, although commendable from the point of weatherproofness, has been found to be conducive to dampness internally. With a soft brick a certain amount of "breathing" takes place, and is probably one great reason why houses built with them have not been universally damp.

When the mortar was set back in the joints of the Church Hall at Westminster the fact was freely commented upon and questioned as to its advantages, but the idea has taken root and been greatly employed elsewhere. Flush joints have also been greatly employed, the mortar simply being finished off with the trowel as the work proceeds.

Thin bricks after the Roman type have also come into vogue, and their judicious employment in arches, strings, and to jambs of doors and windows introduces an artistic element entirely lacking in mechanically-jointed brickwork.

SOME LEGAL QUESTIONS ABOUT EXTRAS.

WE have received the following communication from Mr. J. E. Yerbury, F.S.S. :—

"The article in your issue for August 4 last raises a point which has struck me very forcibly on many occasions when engaged in arbitration and High Court cases, viz. :—Is it not time to call a conference of representative architects and builders to revise the present R.I.B.A. form of contract?

I have had a good deal of experience in arbitrations and in cases before official referees, and am quite convinced that the majority of those cases might have been saved by the use of a more simple form of contract.

I cannot at the moment enter into a detailed criticism of the R.I.B.A. contract, but I should like to refer to one or two of the points raised in your article.

1. Who is liable to pay for extras?

It is obvious that if the building owner requires extra works, and orders them, or

allows the architect, his agent, to do so on his behalf, he (the building owner) is liable. And I think, if having knowledge that work is being done which he has been informed would be an extra, he would make himself liable if he did not repudiate as soon as it became within his knowledge that the work was being done.—

But in the rare cases, I think, when the contract limits the agency of the architect, by the insertion of a clause, or an addition to one of the clauses of the R.I.B.A. contract, setting out that the architect shall not have power to order extra works, or limiting the amount he is authorised to spend upon extras, it is obvious, to my mind, that the architect is liable for all extras ordered by him, not covered by the contract.

It would follow from this that the builder must obtain an order for all works he wishes to charge for as extras, and it will depend upon the form of contract to whom he is to look for the order.

(*a*) Entirely to the architect where no restriction is put upon his authority under the contract.

(*b*) To the architect where his agency is limited in amount, first up to the limit of his authority, and then to the employer.

(*c*) Entirely to the employer where all authority is taken from the architect by the contract.

Under the R.I.B.A. contract the builder must obtain the order for extras in writing, and the failure of unbusiness-like architects to comply with this condition has cost builders thousands of pounds. It is the duty of a builder's foreman to look after his employer's interests, and he is naturally on the look-out for extras. It is the architect's desire to make his work as perfect as possible, and improvements which suggest themselves as the work proceeds are ordered and carried out, and it is only when the builder's account is rendered at the end of the job that the architect is aware that he has been reckless.

The builder naturally charges as much as he can, generally from 25 per cent. to 250 per cent. more than the architect expects. The architect cannot deny the order for work, and would pay what he thinks a reasonable amount—the employer perhaps is willing to pay what the architect certifies, but the builder's idea of a reasonable amount is not the architect's. They soon get into a fight, and then the clause that all extras shall be ordered in writing is pointed out, and the builder has to take what he can get.

But is it quite fair that this clause should work so hardly against the builder?

If an architect of repute gives an order on the job, the builder goes on with the work trusting the architect to send the order, and if he fails to do so it is hard that the builder should suffer the loss of the cost of that work.

In other cases the builder does not know of an extra until the work is completed; the foreman takes the order and carries out the work; he cannot say to the architect, without a certain reflection upon the architect's good faith, "Very well, sir, I will stop the work until you send your order in writing," or "I will not go on with this, as it will be an extra, unless you put your order in writing at once."

The method I have adopted in my own practice is a simple one. I have special books printed for omissions and additions, and for extras. On these order-books I have printed at the bottom a notice in black type that no order will be recognised as an extra unless given on one of these special forms, or by letter signed by myself. On my certificates I also state that the certificate is paid on the understanding that no extras will be charged except those authorised by these orders, the total amount of which are shown on the certificate.

And I make this easy by obtaining an estimate before I give an order for extras if it is possible, and where impossible I state the number of the exceptions.

In this way I know exactly where I am, and the builder is in the same position. The building owner, when he receives my certificate, knows that there are extras, and generally the amount—where exceptions are comparatively numerous, he has his attention called to the fact as the work proceeds.

Builders who have worked under me for the first time have complained that my methods were irksome, but before the end of the job they have usually informed me that they wish every architect would adopt my plan; and I have never had to fight a builder or found a client dissatisfied at the end of a job.

2. The next point I wish to refer to is that under the R.I.B.A. contract the only safeguard to the builder is the arbitration clause, for, as you say in your article, "the builder submits himself entirely to the judgment of the architect" subject to arbitration.

With a strong and just architect this works well enough, but with a weak or unjust one, or one under the thumb of an employer, very badly indeed. It is true the builder, if he can afford it, may take advantage of the arbitration clause, but this means time and money, and at present the arbitrator is nearly always an architect, and my experience is that the architect who is a good arbitrator on a building contract is very difficult to find. The arbitrator should always be a lawyer, or, if an architect, one specially qualified by experience and training to deal with matters in a judicial manner, and they are rare. I remember one case where a distinguished arbitrator, who was an architect, gave very heavy penalties against a builder upon facts which only an architect who had been in similar difficulties himself could possibly have given such an award. He was honest, but he treated his brother architect as he would wish himself to be treated, and could not appreciate the position which really existed.

Had an appeal been possible, I am quite certain his award would have been laughed at by lawyers.

I do not agree that "it is a nice question how far the architect has authority to bind the building owner in making alterations"; it appears to me to be perfectly clear that the architect is the agent of the building owner and has authority to do all an agent may do, unless such authority is clearly and definitely restricted by the contract; and the owner is bound to pay upon presentation of architect's certificate. I believe there is no safer bond to sue upon than an architect's certificate properly given under the R.I.B.A. contract.

I fear your space will not allow me to deal with other points in your article, but I trust you will allow me the opportunity of raising these questions in your columns, viz:—1. Is it not time the R.I.B.A. contract was revised and very greatly simplified? 2. If this is done, would it not be more satisfactory that the arbitrator should be a lawyer rather than an architect? It may be said that this would take remunerative work from one profession and transfer it to another, but I don't think this would be the case. The arbitrator being a lawyer, architects would be employed to state the case rather than counsel.

BUILDING AND LABOUR IN MELBOURNE.

We learn from the Melbourne *Argus* that great difficulty is being found by architects and others who have building contracts to let to find builders who are willing to undertake them. Even for large city jobs, where there is abundant room for high profit, very few tenders are received, while tenders have to be called again and again for important country jobs before anybody can be found willing to execute them. The reason is not that builders are less enterprising or that they are at all unwilling to undertake the work. They are not able to do it, because they cannot obtain tradesmen to man the jobs. The difficulty has reached an acute stage. The Master Builders' Association has 110 members. Details of the number of men urgently needed by all of them showed that the trade was undermanned to the enormous extent of 50 per cent. The number of bricklayers, plasterers, painters, plumbers, and so forth requires to be doubled before it will be possible for the builders to cope with all the work which requires to be done. It is not that there has been any extraordinary boom in the building trade. For years past there has been a steadily increasing activity in the trade. The population of Melbourne and of Victoria has been growing, and people must be housed. Businesses of all sorts have been increasing, and larger buildings will be needed. At all holiday seasons the existing accommodation is unable to meet requirements. There has been extension in this direction. Hundreds of thousands of pounds are being spent every year in that branch of business alone. Warehouses, factories, shops are being rebuilt and enlarged in all parts of the city. Public buildings are being erected to meet the increased requirements of Government institutions. Hospitals and charitable institutions of all kinds require more building accommodation. The growth of population and the increased prosperity of the country are jointly responsible for this, for it is the same all over Australia. In Sydney a great number of very large building operations have been postponed until the builders are able to deal with them. The tradesmen to do the work are not to be found in Australia, and those who want the buildings just have to wait. At least 500 bricklayers are urgently needed in Melbourne. By "bricklayer" is meant a skilled tradesman. Every man who calls himself a bricklayer does not comply with that description. It is estimated that if 500 bricklayers could be obtained there would be room also for at least 150 additional bricklayers' labourers, 150 plasterers, and 200 painters, carpenters, carpenters' labourers, and plumbers. In these estimates no account has been taken of the needs of the country districts, though the scarcity of labour there is greater than in the city, for tradesmen have gradually deserted the country to take up the more congenial work in Melbourne. Wages in the trade are high, while the hours are limited to forty-four per week. Bricklayers receive a minimum of 1s. 6d. per hour—66s. per week. Plasterers are paid 11s. 8d. per day. Painters receive 1s. 3d. per hour. Plumbers' wages are 1s. 7½d. per hour, and tuck-pointers are paid 11s. to 12s. per day. Carpenters receive from 69s. 8d. a week for foremen who exercise control over the work of three men or more to 52s. 3d. a week for ordinary carpenters' labourers. The working carpenter receives 64s. 2d. per week. Their hours are forty-four a week. They do not commence work until a quarter to eight o'clock in the morning (double rates are paid for time worked before that hour), and do not work after a quarter-past five o'clock on week days and a quarter past twelve o'clock on Saturdays. All holiday work is paid for at overtime rates. Wages boards control the wages and hours of all the workmen in the building trade, and some of these boards are even now considering determinations which will increase the rates. Although these rates are fixed by wages boards, they are only the minimum. Builders pay good tradesmen considerably higher rates. An increase of 1s. a day is gladly given to retain the services of good tradesmen.

GENERAL BUILDING NEWS.

NEW SCHOOL, CRAIGTON.

This school has been erected to provide accommodation for 1,020 pupils, and has been designed by Messrs. Watson & Salmond, architects, of Glasgow.

NEW SCHOOL, WEMYSS.

Mr. G. Charles Campbell, of Methil, is the architect for the new school which it is proposed to erect in Methil. The estimated cost of the work is 10,000*l.*, and the accommodation is for 1,000.

NEW SCHOOL, SUTTON VALENCE.

These buildings have been erected by Messrs. Wallis & Sons, Ltd., builders, of Maidstone, at a cost of about 30,000*l.* The architect for the work was Mr. H. Percy Adams.

NEW SCHOOL, MONKTON.

A new school is to be erected, providing accommodation for 160 pupils, at an estimated cost of about 975*l.* The architect is Mr. W. W. Reid.

PUBLIC SCHOOL, MUTHILL.

Additions are to be made to this school, including rooms for cookery, laundry, and woodwork, etc. The following are contractors for the work:—Mason, Mr. J. T. M'Robbie, Muthill; joiners, Messrs. Taylor & Scobie, Blackford; slater, Mr. R. Williamson, Muthill; plasterer, Mr. Jas. Gorrie, Crieff; plumbers, Messrs. Bennett & Ferguson, Crieff.

PUBLIC LIBRARY, NEW CROSS.

Messrs. Castle & Warren, architects, of Norfolk-street, Strand, W.C., prepared the designs for this new library, which has been erected at a cost of about 12,000*l.* The builder was Mr. F. J. Gorham, and the heating arrangements were carried out by Messrs. Buckley & Co.

PAVILION AND WINTER GARDENS, MARGATE.

These improvements at Margate include the erection of a pavilion, with seating accommodation for 2,500, an open arena with accommodation for 1,200, and balconies overlooking the sea with a provision for 500. The whole scheme has been designed by Mr. Borg, the Borough Engineer, and the estimated cost is about 23,000*l.* The contractor for the work was Mr. Denne.

TRADE NEWS.

A new clock has been ordered for the Parish Church, Widford Church, near Ware, Herts, which will strike the hours and show time on a large dial. It is to be fitted with all the latest improvements, and generally to the designs of the late Lord Grimthorpe. The makers are Messrs. John Smith & Sons, Midland Clock Works, Derby. The same firm have also recently made clocks at Saxthorpe Church, Norfolk, and Barton Mills Church, Suffolk.

Boyle's latest patent "air-pump" ventilators have been applied to Burton-on-Trent Grammar School.

The John Coupland Hospital, Gainsborough, is being supplied with Shorland's double-fronted patent Manchester stoves with descending smoke flues, patent Manchester grates, exhaust roof ventilators, and inlet ventilators, by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

APPLICATIONS UNDER LONDON BUILDING ACTS, 1894 to 1909.

Width of Way.

Holborn.—Erection of a building upon the site of Nos. 9, 10, and 11, Eagle-street, Holborn (Mr. W. C. Waymouth).—Consent.

Width of Way and Line of Frontage.

Fulham.—Erection of buildings on the south-western side of Burlington-road, Fulham (Mr. L. Kesteven for Mr. J. F. H. Shepherd).—Consent.

Line of Frontage and Construction.

Hammersmith.—Showcase in front of No. 340, King-street West, Hammersmith (Mrs. L. Raleigh).—Consent.

Kensington, South.—Showcase at No. 11A, Church-street, Kensington (Mrs. L. D. Cancellor).—Consent.

Width of Way, Projection, and Construction.

City of London.—Brick, steel, and concrete gangway over the public way of Catherine Wheel-alley, Bishopsgate (Mr. H. E. Hovenden).—Consent.

Width of Way, Deviation from Certified Plan, Projections, and Construction.

Kensington, South.—Addition over the motor garage at Nos. 39 and 41, Queen's-gate-place-mews, Kensington, the erection of an external iron staircase and balconies, and the erection of a boundary fence (Messrs. W. D. Hodges & Co., Ltd.).—Consent.

Space at Rear.

Kensington, South.—Addition at the rear of No. 4A, Duke's-lane, Kensington (Messrs. Moore & Hunter for Mrs. E. E. Annett).—Consent.

Strand.—Hotel building upon a site abutting upon Glasshouse-street, Air-street, Brewer-street, and Sherwood-street, Westminster (Messrs. W. J. Ancell and H. Tanner, jun.).—Consent.

Westminster.—House to abut upon the western side of Smith-square (Mr. E. L. Lutyens for the Right Hon. R. McKenna, M.P.).—Consent.

Space at Rear and Alteration of Buildings.

Clapham.—Alterations at Nos. 310, 312, and 314, Clapham road, Clapham (Mr. J. J. Freeland for Mr. F. G. McKim).—Consent.

Southwark, West.—Alterations at Nos. 145, 147, and 149, Borough High-street (Messrs. S. Haskins & Brothers).—Refused.

Building for the Supply of Electricity.

Hampstead.—Two wooden cooling towers with steel sub-structures at the Hampstead Metropolitan Borough Council's electricity generating-station, Lithos-road, Hampstead (Klein Engineering Company (1908), Ltd., for Hampstead Metropolitan Borough Council).—Consent.

Holborn.—Steel and concrete chimney-shaft at the electricity generating-station, Short's-gardens, Holborn (Charing-cross, West-end, and City Electricity Supply Company, Ltd.).—Consent.

Limehouse.—Iron building beneath the coal-weighing hopper at the southern end of the telpher track at the electricity generating-station of the Stepney Metropolitan Borough Council, Narrow-street, Limehouse (Mr. W. C. P. Tapper for Stepney Metropolitan Borough Council).—Consent.

Limehouse.—Coal hopper and an ash hopper at the electricity generating-station, Narrow-street, Limehouse (Messrs. Strachan & Henshaw, Ltd., for the Stepney Metropolitan Borough Council).—Consent.

Uniting of Buildings.

City of London.—Uniting of a new building in Poppin's-court, Fleet-street, with Nos. 107 to 111, Fleet-street (Messrs. Smee & Houchin for Messrs. Thomas Cook & Son).—Consent.

Peckham.—Formation of an opening in the party wall between Nos. 24 and 26, Atwell-road, Peckham (Mr. A. Harris for Mr. J. Lennard).—Consent.

Strand.—Additional openings in the party wall between No. 3, Clifford-street, and No. 14, Old Burlington-street, W. (Mr. C. H. Townsend for Messrs. Owen Grant, Ltd.).—Consent.

Uniting of Buildings and Cubical Extent.

Bermondsey.—Steel, iron, and glass van shelter over a yard at the premises of the Salvation Army on the southern side of Spa-road, Bermondsey (Mr. A. Gordon).—Consent.

PROJECTED NEW BUILDINGS IN THE PROVINCES.*

ALTRINCHAM.—Institute and alterations to Sunday school (1,600*l.*); Trustees, Bowdon Downs Congregational Church.

Arnold.—School (4,650*l.*); Mr. C. J. Bristowe, Secretary, Education Committee, Notts County Council, Nottingham.

Blackhall Mill.—School; Mr. Wood, architect, Burnopfield.

Blymhill.—Enlargement and improvement of schools; Architect, care of The Managers of the parochial schools.

Bolton.—Central offices, Bridgman-place (5,000*l.*), for the Lancashire and Cheshire Miners' Federation.

Branksome Heath.—Enlargement of girls' school; Mr. C. Lisby, Secretary, Education Committee, Poole Town Council.

Brighouse.—St. Chad's Church (12,000*l.*); Mr. W. H. Wood, architect, The College, Durham; Messrs. W. J. Briggs & Sons, builders, Brighouse. Extensions to premises, Valley Dyeworks, for the Bradford Dyers' Association, Ltd.

Broadstairs.—Showrooms and offices for the Broadstairs Gas Company.

Chelmsford.—Extensions to library (800*l.*); Mr. C. Brown, surveyor, Chelmsford Town Council.

Chester.—Laundry centre (740*l.*); Mr. T. G. Huxley, builder, Malpas.

Courthill.—School (250 places); Mr. S. J. Newman, Surveyor, Poole Town Council.

Coventry. — Conversion of Primrose-hill House into slipper baths (2,000*l.*); Mr. J. E. Swindlehurst, Surveyor, Coventry Town Council.

Crowborough.—Enlargement of St. John's School; the Managers.

Darwen.—Cottage home; Architect, care of Clerk to the Guardians.

Dumbarton.—Hall (1,500*l.*); Mr. W. Reid, Church Street, Dumbarton.

Dunvant.—Extension to Three Crosses Independent Chapel; Mr. W. David, architect, Swansea.

Elgin.—Slipper baths (3,000*l.*); Mr. A. A. Turriff, Burgh Hall, Elgin.

Ellesmere Port.—Alterations to Station Hotel (2,000*l.*), for the Birkenhead Brewery Company.

Folkestone.—The following plans have been passed:—Motor garage, Beacholme, Lower Sandgate road, for Mr. H. R. Kirk; Mr. A. R. Bowles, architect. Additions to garage rear of Nos. 48-50, Rendezvous-street, for Messrs. Gamble & Co.; Mr. O. Marx, architect and builder. Rebuilding additions to No. 28, Ford-road, for Mr. H. W. Rye; Mr. H. Videan, architect.

Glasgow. — Public library, Clydebank (10,000*l.*); Messrs. Gardner, Millar, & White, architects, 144, St. Vincent-street, Glasgow.

Halifax.—Six tramway shelters: Mr. W. M. Rogerson, Tramway Engineer, Halifax Town Council.

Hebden Bridge.—Alterations to Bankfoot Mill for Messrs. Crabtree Brothers.

Herne Bay. — Extensions to East Cliff Pavilion (5,355*l.*); Messrs. W. Pattinson & Sons, builders, 50, Parliament-street, S.W.

Hornchurch.—Enlargement of the South Hornchurch school (1,450*l.*); Mr. G. Brown, builder, Maidstone-road, Grays, Essex.

Horton Kirby (Kent).—School, Birchwood-corner (2,150*l.*); Messrs. Hodder & Son, builders, Bromley.

Houston (Renfrewshire). — Extensions to school (2,000*l.*); Mr. W. Kerr, builder, Houston.

Hull.—Training college (40,290*l.*); Messrs. G. H. Panton & Sons, builders, 206, Anlaby-road, Hull.

Huntingdon. — Enlargement of school (1,185*l.*); Mr. J. C. Wrigley, Secretary, Education Committee, North Riding of Yorks County Council, Northallerton.

Hyde (Cheshire).—Swimming baths (3,000*l.*); Mr. Joseph Mitchell, Council Offices, Hyde.

Keighley.—School (4,700*l.*); Mr. A. P. Harrison, architect, Highfield-lane, Keighley; Messrs. H. V. Robinson, Ltd., builders, Lawkholme-lane, Keighley. School (2,000*l.*); Mr. H. Shackleton, Sefton-road, Morecambe. Lloyds Bank (6,000*l.*); Mr. S. Kitson, architect, Greek-street Chambers, Leeds; Paul Rhodes, builder, Skinner-lane, Leeds.

Langley Green.—Extensions to premises for Messrs. Ham, Baker, & Co.; Mr. William Jackson, builder, Langley Green.

Lithney.—School (1,700*l.*); Mr. Sampson Hill, architect, Green-lanes, Redruth.

Littlemill.—Instruction centre for the Coylton School Board.

Lowestoft.—School, Christ Church-square; Messrs. B. Oliver and H. J. Chetwood, architects, Sudbury.

Manston. — School; Messrs. Connon & Chorley, 16, Park-square, Leeds.

Matlock.—Post Office (12,000*l.*); Mr. J. W. Wildgoose, builder, Matlock Bath, Derbyshire.

Middlesbrough.—Extensions to shipping offices, Albert-road, for Messrs. Constantine & Pickering. Clothing factory for Messrs. Stewarts, Ltd.

Newhaven.—School; County Architect, East Sussex County Council, County Hall, Lewes

New Shildon.—Territorial headquarters; Mr. H. C. Chapman, architect, Grainger-street, Newcastle-on-Tyne; Mr. J. Moore, builder, New Shildon. Hall, etc.; Mr. H. Chapman, architect, Grainger-street, Newcastle.

Newton Abbott.—College (40,000*l.*); Messrs. Mitchell, Son, and Gutteridge, architects, 9, Portland-street, Southampton.

Newtown.—Shop, Buxton-road, for the New Mills Co-operative Society.

Pensilva (near Liskeard).—School (2,100*l.*); Mr. J. C. Andrew, architect, Biddicks-court, St. Austell.

Penzance.—School (4,000*l.*); Mr. Sampson Hill, architect, Green-lanes, Redruth.

Port Erroll.—Extensions to school (2,155*l.*); Mr. A. H. L. McKinnon, architect, 245, Union-street, Aberdeen.

Radcliffe.—Extensions to asylum (29,300*l.*); Mr. E. Purnell Hooley, Surveyor, Notts County Council, Shire Hall, Nottingham. Infirmary (21,136*l.*); Messrs. Wooldridge & Simpson, builders, Oxford.

Redruth.—House; Mr. Leonard Winn, architect, Boscower-street, Truro.

Rochford (Essex).—Alterations to workhouse; Mr. F. Gregson, Clerk, Rochford Board of Guardians, Southend.

Rotherham.—Plans have been passed for Messrs. Armston & Wortley for nine houses, St. Stephen's-road; also for Mr. D. Hobkinson, for alterations and additions to Nos. 93, 95, and 97, Frederick-street.

Sheffield.—Proposed enlargement of nurses' home (about 9,000*l.*) for the Sheffield Royal Hospital Board.

Staverton.—Isolation hospital (7,700*l.*); architect, care of Mr. J. B. Williams, Surveyor, Daventry Rural District Council.

Stretford.—A plan has been passed for Messrs. John Greenwood & Sons, Ltd., for a bakery in Elevator-road.

Sutton-in-Ashfield.—School (4,350*l.*); Mr. J. Greenwood, builder, Mansfield.

Swansea.—Six mills near present works for the Dyffryn Tinplate Company, Morriston.

Taunton.—Additions to library, Corporation-street (1,430*l.*); Mr. F. Small, builder, Newcastle.

Torquay.—Two houses near Trenchford Dam; Mr. W. B. Crocker, builder. Three conveniences (700*l.*); Mr. H. A. Garrett, Engineer, Torquay Town Council. The following plans have been passed:—Additions and alterations to Stoodley Knowle for Colonel Burn, M.P. Additions to "Highfield," Middle Warberry-road; Mr. C. Hankey. Alterations and additions to Conway House; Hon. E. Douglas. Additions to "Rocombe," Higher Warberry-road. Mr. R. Skir. Motor garage, "The Nest," Mr. J. M. Petley. Six houses, Mallock-road; Mr. Johnson.

Wallsend.—School (10,000*l.*); Messrs. Marshall & Tweedy, architects, Eldon-quare, Newcastle.

Warrington. — Extensions to workhouse (1,700*l.*); Messrs. W. & S. Owen, architects, 4, Cairo-street-chambers, Warrington.

Warwick.—Children's homes (3,000*l.*); Mr. F. Cundall, architect, 34, The Parade, Leamington, Spa.

West Bridgford (Notts).—School (4,050*l.*); Messrs. Bosworth & Love, builders, Nottingham.

Wigan.—Proposed abattoir for the Wigan and District Co-operative Society. Plans have been passed as follows:—Extensions to slaughter house, etc., Miry-lane, for Messrs. Gallagher Brothers. Three houses, etc., Bolton and Hen-streets; Mr. John Winstanley. Additions to Nos. 199 and 201, Poolstock-lane; Mr. H. Tittensor.

Worksop.—Twenty-eight houses, Kilton-road, for the Worksop Co-operative Society.

York.—Proposed receiving home, Haxby-road (1,200*l.*); Mr. G. Sykes, Clerk, Board of Guardians, York. Working-class houses, Alma-terrace (1,300*l.*); Mr. F. W. Sparr, Surveyor, York Town Council.

* See also our list of Competitions, Contracts, etc., on another page

LAW REPORT.

BEFORE THE OFFICIAL REFEREE
(Mr. MUIR MACKENZIE).

Contractor's Action against Building Owner.
Minter *v.* Waldstein.*

THE hearing was resumed last week of this case, it being an action brought by Mr. F. G. Minter, a builder and contractor, living at Wimbledon, to recover 2,750*l.* from the defendant, Mr. Chas. Waldstein, a Professor of Fine Art at the University of Cambridge, which sum the plaintiff alleged to be due to him under a certificate of Mr. William Foster, an architect, in respect of the reconstruction of Newton Hall, near Cambridge, of which the defendant is the owner. Defendant counterclaimed for 10,000*l.* damages, alleging that the plaintiff's work was defective, and that the materials used were not in accordance with the specification.

The facts of the case and the evidence were fully reported in the issues of the *Builder* of July 14, 21, 28, and August 4 last.

On Thursday last week Mr Jude was cross-examined by Mr. Lewis Thomas.

He said he had been in business at Harston, which was a small village near Cambridge. He had never built such a large house as Newton Hall, and never wanted to. He had written to Mr. Foster, before the tenders went out, that he would be glad to do any work in the reconstruction of Newton Hall if he was given the offer. He did not get any offer until after Minter was doing the work.

Did considerable friction arise between you and Mr. Minter when you were doing some supplemental work?—If you refer to the conservatory, I say yes.

Cross-examination continued,

It was occasionally the case in new buildings that work had afterwards to be done in easing doors and adjusting locks. Lyon, the butler, gave him the order to come to Newton Hall and ease the doors.

Do you say that it is a proper thing for one man alone to take down a door for the purpose of easing it?—I do not see anything improper in it.

If you put plaster and wood in contact, is it an uncommon thing to find that the plaster will come away from the wood?—I do not recollect ever seeing such a thing before.

Cross-examination continued,

Plaster, of course, had to be put on damp. He did not admit that dry weather would affect it.

What causes a hair crack in a ceiling?—I do not know.

Is it the dry atmosphere on the plaster which causes it?—It might be.

Cross-examination continued,

He considered that the drawing-room ceiling was badly cracked. It had more than a hair crack. The china store cupboard was plugged to the wall, and he thought that the plugs had drawn out of the wall. It was a perfectly proper thing to put linoleum on wood block flooring, provided the flooring was dry when the linoleum was put on. He did not know when he went to Newton Hall, on July 19, that he was to give evidence in this case. He only knew the dates when stamp paper was fixed to the cracks by seeing the dates written on the stamp paper in pencil. A good many of the doors which required to be eased were the doors to cupboards. It was not an uncommon thing to have to adjust the doors to cupboards.

The footman's room door required easing from the top. Great heat, no doubt, would affect joinery. He did not know that where the corner cupboards were the hot water pipes were which ran to the radiators; but it might be so.

Mr. John Murray, F.R.I.B.A., Principal Architect and Surveyor to the Commissioners of Woods and Forests in London, and architect to several public bodies, examined by Mr. Clavell Salter, said he had had some twenty-five years' experience, and on March 6 he was retained by the defendant in regard to the contract job in question. He visited Newton Hall on March 11, 13, 27, and 28, and on June 28 and 30. He on all those occasions made a careful inspection, and he had carefully perused the documents in the case, and made a report upon the matters in question. Referring to the roof over the new wing, he said his assistant had prepared a drawing of the roof of the new wing. In his judgment, the roof over the new wing was not properly framed. In his opinion, the timber and wood work was not of the best quality. Some of the timber had shakes in it, and some of it was sappy. The purlins were shaky. The curbs were shaky on both sides. He did not think that the timber of the roof had been subjected to any greater heat than a roof should be capable of bearing. The rafters, too, had not been properly fitted. The rooms underneath were attic rooms in the roof, and the cross ties or collars of the roof formed the ceiling joists of the attics below. All the ties or collars were fastened to the rafters by spikes or nails; but in his opinion they ought to have been affixed by a hard joint, which should also be spiked. He also thought that the spacing of the rafters was faulty. Two rafters, which bore the weight of the water tanks and bearings, were not capable of bearing the weight put upon them. Adjoining the new roof there was a bell turret. He did not think that the supports of that turret were sufficient. The roof plates bedded under the new roof ought to be affixed in some way to the horizontal joists of the second floor—tied in. The roofing felt used, too, was not, in his opinion, of the proper quality. He found that some of the slates had not been properly fixed. He found several of the slates defective. He did not consider the work round the bell turret was properly done.

Referring to the twin roof, the witness said that, in his opinion, it was not properly framed, and there were indications of continuing spreading. The rafters there were improperly fixed to the ridge also. It did not show good workmanship. He did not consider the timber used in the roof was of the best quality, and some of it he regarded as being very bad. Witness also referred in great detail to instances in which he said he did not consider the roof had been constructed in a proper and workmanlike manner.

In his opinion there were not proper and sufficient collars to the roof. Longer collars should have been fixed lower down to tie the purlins together.

Witness also gave evidence to the damage which had been caused by the sagging of the ceiling joists in certain cases. He said that in those cases there were no proper trimmers to the ceiling joists. He had examined throughout the whole house, and made a report upon the actual spacing of the floor joists, and rafters, and things of that kind. The joists did not run parallel as they should do, because they were very unevenly placed and spaced. He had made a very careful examination of the house for the purpose of finding out whether there had been any settlement of the floors. He found that there had been settlement of the floors, which he considered were serious settlements, and he had proved that the settlements had not ceased. The result was, that the ceilings had cracked very largely, and the partitions had also cracked seriously, and the joinery had opened very considerably at the joints. In his report, he had not mentioned mere hair cracks, nor had he put in all the cracks that he had seen. He attributed the cracks to the deflection of the floor above them. He had mentioned in his report the extent of the sags in the floors, and also the extent of the cracks in the ceilings and partitions.

On Friday, Mr. Murray was examined at great length and in great detail as to the alleged defects in the construction of the building, and the cause he assigned for the cracks which had appeared in the ceilings and partitions. He stated that he noticed a considerable increase in the cracks between the visit he made to Newton Hall on June 13 and the visit he made to the Hall last month. He noticed upon his visits in July that the stamp paper, which had been affixed to certain of the cracks upon an earlier occasion, had broken.

The witness said that, in his opinion, to remedy the defects in the construction of the building so as to make it conform with the contract and specification, it would be necessary to have the whole of the valuable furniture in the house removed.

Cross-examined by Mr. Lewis Thomas:

He did not draw himself, personally, every detailed drawing which went out of his office, but he never allowed a single drawing to go out of his office without seeing it first and revising it, if necessary. He had not troubled to find out whether there had been an order upon the plaintiff to put the soil pipes in where they were put, for the reason that he was only instructed to report upon the matter, whether the specification had been carried out or not.

Is it a good thing to subject newly constructed timber to severe heat?—It depends largely on the amount of heat.

Severe heat?—It depends upon what the amount of severe heat is. If you mean very excessive heat, I should say no.

Very excessive heat would be harmful to the timber?—I should say so.

Remember that this timber was put in in a very damp season—1910. In December, 1910, we hear that the temperature of the house was kept up to 84 degrees. Assuming that to be correct, was it fair to subject this timber with damp plaster in the house to a temperature of 84 degrees?

Witness replied that if the mean temperature of the house was kept at 84 degrees, he should say that it was not fair; but he did not understand that the whole of the house was kept at that temperature.

Mr. Clavell Salter said that the evidence showed that the understanding of the witness was correct.

Cross-examination continued.

In his opinion the whole of the timber in the building was not remarkably fine in the smoothness of the cut. It was not bright, to say the least about it. It was probable that it was in consequence of his opinion that the whole of the timber in the building was condemned; but he did not think that it was condemned on his opinion alone. He did not complain of the quality of the rafters, but of the way they were fixed. It was bad workmanship he complained of.

He had heard that the tanks were supplied to special order after the roof had been constructed. That fact did not modify his criticism as to the roof, because the roof could have been properly supported by proper means. Of course, if the contractor had been properly instructed to hang the tanks to the rafters, he would presume he was right.

Mr. Murray, further cross examined by Mr. Lewis Thomas, said he admitted that Mr Minter enjoyed a very high reputation for joinery work. He knew that Newton Hall was a house of a professor of art at Cambridge University. He did not suggest that because the house was a more or less show place that Mr. Minter would be less careful about his joinery work there than elsewhere. He did not know that the whole of the wood used in the joinery work had been standing for over two years in Mr. Minter's yard. He admitted that a proportion of the joinery work was first-class joinery work, but the whole of it was certainly not, in his opinion.

Cross-examined as to the twin roof, the witness said that he considered that the joints of the roof were very imperfectly made.

Re-examined by Mr. Clavell Salter:

At the time he was appointed architect, on March 6, he knew that proceedings were going on. At least, he knew that something was going on, but he did not know what it was.

One general question as to the condition of the timber—not as to the quality. You have told my learned friend that excessive heat would tend to increase the number of shakes—that the rapid drying would tend to increase the number of shakes. Are the shakes in this timber of the number or kind you would expect to find in timber of good quality?—No.

It would not be first-class building to put in damp timber?—No.

On no account, replied the witness, could the tanks, battens, and rafters be described as being of the best quality.

If this house had been built of timber of the quality specified, and with the joists spaced as shown on the contract drawings and specification, would these defects, in your opinion, have appeared?—I consider that nearly all of them would not have appeared.

Cross-examination continued.

It was the fact that the rafters of the twin roof were composed of rafters of different lengths. In his view, as an experienced architect, it would not be right or reasonable to leave the sagged floors as they were.

With regard to the slating of the roofs, it was, speaking generally, the fact that he had found several defective slates. He had found the wall plates twisted in the tilting. To his mind that pointed to movement in the roof, which was due to some heavy weight or strain. The scheme of reconstruction he had prepared in March or April was confirmed, in his opinion, afterwards, by what had subsequently happened. In plaster work hair cracks were practically unavoidable; but in his view the cracks which had appeared in the plastering work in the present case ought not to be found in first-class work.

Mr. William C. Easdale, examined, said he was a civil engineer and a member of the firm of Messrs. Shenton & Easdale, civil engineers, of Victoria-street, with great experience in drainage matters. Witness stated that, in accordance with instructions, he, accompanied by an assistant, went in March last to Newton Hall to inspect the drainage constructed by the plaintiff, and gave evidence detailing defects he had found in the construction of the manholes, thickness of the concrete as specified, cesspool, and other matters.

Cross-examined, he had been in business on his own account about two years. Before he went into business on his own account as a sanitary engineer, he had acted as the London representative of Messrs. Adams, sanitary engineers. He had expressed his disapproval of the land treatment of sewage, where the land was unsuitable; but he considered that land treatment was best where there was suitable land. He considered that the excavations

* Continued from p. 146.

he had made did not affect the stability of the construction where the construction was good. He had found that several lengths of drain, which appeared in the drawings, had been omitted from the stable yard.

He was not an expert in brickwork. He had complained that two soil pipes had come down inside the house. He admitted that he had made a mistake there. He noticed that the brickwork of the main part of the cesspool was open jointed. He did not notice that the cesspool was constructed to a design as a soak-a-way. He thought that a cesspool constructed as a soak-a-way ought to be prohibited by Act of Parliament.

He did not know that the whole of the drainage work was done on "measure and value."

If this is a contract on "measure and value" or "material and labour," if anything else has to go in it is at the expense of the employer, is it not?—Yes.

Do you say that in these circumstances it was necessary to put in concrete under these iron pipes?—Yes, certainly.

Re-examined.

He saw no sign that the sewage works had been improperly used.

Sir Alexander Stenning, examined by Mr. Clavell Salter, said he had been a surveyor for many years. He went down to Newton Hall on July 20. He had examined the spacing of the floors, and found them to be as stated by Mr. Murray. He considered that the spacing of the floors was a serious deviation from the specification. He considered that the reduction of the strength below the standard provided for by the specification, was about 25 per cent. He found that the first floor rooms and the attic rooms were spaced upon the average at intervals far exceeding 12 inches. He also found that the partitions, instead of being wood partitions, were made of patent slab stuff. If they had been timber frame partitions, they would have added to the strength of the floor above—they would have helped to take the weight.

In your opinion, what is the cause of the floors sagging and the ceilings and partitions cracking?—The insufficient strength of the joists as put in.

Examination continued.

He thought that the sagging and cracks would increase as time went on. If nothing was done to the floors, and the house continued to be occupied, it was not possible to say how far the settlement would go, or what the end of it would be.

With regard to the roofing, the witness generally corroborated the evidence of Mr. Murray.

The witness, cross-examined, said he visited Newton Hall on July 20. He went down by the nine o'clock train in the morning and returned to London by the 4.40 train in the afternoon. He had plenty of time to go over the whole place. He had Mr. Murray's figures before he went down. With regard to the spacing of the floor joists, he relied generally on the figures of Mr. Murray. He did not know that the joists he had inspected had been loosely placed in position by the order of Mr. Foster.

In reply to the Official Referee, Mr. Lewis Thomas said that the joists in that particular place had not, when Sir Alexander saw them, been fixed or permanently placed in position.

[The case was proceeding as we went to press.]

FOREIGN AND COLONIAL.

Building Construction, Brazil.

The *Diario Official* of July 1 notifies that tenders will be opened on August 21 at the offices of the "Quinta Divisão do Departamento da Guerra, Ministerio da Guerra," Rio de Janeiro, for the erection of the main building intended for the Central Army Hospital in Rio. A deposit of 5,000 milreis (about 333*l.*) will be required to qualify tenders.

Post Office, Nitheroy, Rio de Janeiro, Brazil.

The *Diario Official* of July 7, publishes a decree (No. 8,803) opening, in favour of the Ministry of Communications and Public Works, a credit of 537,000 milreis (about 36,000*l.*) for the construction of a building intended for the Postal-Telegraph Office in Nitheroy, State of Rio de Janeiro.

Building in Turkey.

It appears from a recent report to his Government by the United States Consul-General at Beirut that building operations in Constantinople have not kept pace with the growth of population. One cause of the increased demand for houses is that the Eastern custom of permitting several generations of a family to live in the same house, often a small one, is yielding to modern requirements, and the son who marries now prefers a house of his own. Immigration from the Provinces is now rendered possible by the Constitution, which permits the people to establish their domicile wherever they wish. The fires in the congested quarters seem to destroy more buildings than the people erect. Various signs point toward an approaching "building boom" in Constantinople. There exists a strong demand for apartment houses, office buildings, and warehouses equipped with modern conveniences. Already many new buildings are planned. Five structures at Robert College, a new bank building for the Bank of Athens, a new hotel, and three or four large buildings for the American College for girls, are all in course of erection, mostly of reinforced concrete. Articles for house construction, including structural iron, builders' hardware, galvanised tin and asbestos roofing, lifts, plumbers' supplies, lavatory fittings, should find a market. A list of British commission agents established in Constantinople may be obtained by British firms on application to the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

LONDON COUNCILS.

Acton.—The Highways Committee have decided to repair Warple-way, Acton Vale, with "Durax" paving, and Creffield road with tar macadam, and application is to be made to the Local Government Board for sanction to a loan of 900*l.* and 600*l.* respectively, the estimated cost of the work.

Barnet.—The Council have agreed, subject to the usual sanction, to purchase the Old Barnet brewery at a cost of 1,000*l.* as a site for new Council offices. The Surveyor had been instructed to prepare plans and specifications for the erection of a further twenty-two cottages in Totteridge lane. The following plans have been passed:—Mr. F. W. Hackforth Jones, J.P., three houses, Arkley; Edmonton Co-operative Society, Ltd., lock-up shop and store, High-street.

Ealing.—500*l.* is to be spent in adapting the premises, 35, Bond-street, for offices for the Electricity Undertaking.

Edmonton.—The Guardians have instructed their architect to prepare plans and specifications for the erection of three workshops for the industrial training of children in schools at an estimated cost of 900*l.*

Finchley.—The following plans have been passed:—Mr. C. W. Scott, three houses, Fitzalan-road; Mr. E. Evans, fourteen houses, Fairlawn-avenue; Mr. C. H. Talbert, alterations and additions to No. 93, High-street, North Finchley.—A proposal is before the Council to negotiate for a suitable site for an open-air swimming bath.

Hendon.—The following plans have been passed by the Rural District Council:—Alterations and additions, "Duck in Pond" public house, for Messrs. Benskins. Proposed petrol store, High-street, Edgware, for the Gas Lighting Improvement Company.

Hornsey.—The result of negotiations between the Borough Council, the County Council, and the Board of Education, in regard to the erection of a new secondary school for girls at Stroud Green, is that plans of the site are to be submitted not later than December 31 next, and plans of the building not later than December, 1912; also that the buildings are to be ready for occupation by September, 1914. The following plans have been passed:—Six houses, Danvers-road, for Mr. H. East, Redstone-road, Hornsey; additions, Hornsey Cottage Hospital, Park-road, for Mr. G. Lethbridge, Draper's-gardens, E.C.; cinematograph theatre, Wightman road, Harringay, for the Estate Land & House Company, Weston-park, Hornsey.

Islington.—The tender of Wm. Griffiths & Co., Ltd., has been accepted at 5,860*l.* for paving the margins of the carriageways in part of Green-lanes, Newington Green, and Mildmay Park. Repairs are to be carried out to the wood paving of the carriageway of Hornsey-road, at an estimated cost of 200*l.* The blocks required are to be obtained from Messrs. Thos. Gabriel & Sons, Commercial-road, S.E.

Richmond.—Plans have been passed as follow by the Town Council:—Additions, Grafton House, Kew-road, for Messrs. Brewer, Smith, & Brewer; alterations, "Duke's Head," public house, for Messrs. Nowell, Parr, & Kates; three houses, West Park-road,—for Messrs. Boore & Parker.

Staines.—The following plans have been passed by the Rural Council.—Re-building Baptist Chapel, Bedfont; the Trustees. Four houses, Dawley-road, Harlington; Messrs. Newbold & Stevens. Three cottages, Laleham; Mr. Simpson.

Watford.—The tender of Messrs. W. King & Son has been accepted by the Urban Council for private street works to Whippendell-road and Sydney-road, at 618*l.* 13s. and 192*l.* 2s. respectively. The following plans have been passed:—Mission hall, Upper Paddock-road, for Mr. A. P. Ibbott; conversion of house into shop, Banbury-street, for Mr. E. Clifford; additions, Coleman House, Clarendon-road, for Mr. T. Pebardy; house, stable, etc., Holywell-road, for Mr. T. Simmons; alteration of premises, Loates-lane, for Messrs. Downer & Sons; motor garage, Whippendell-road, for Mr. J. Wheeler. A plan has been lodged for a shop in Queen's-road, for Mrs. Kempton. The Rural Council has passed the following plans:—Alterations and additions, Porters Park Golf Club for the managers; buildings, Caldecote Towers, for Miss Tanner.

Wimbledon.—The Borough Surveyor has been instructed to obtain quotations for paving with soft wood blocks that portion of Merton-road between Holy Trinity Church and St. Winefrede's Church. Mount-road and Highbury-road are to be made up at an estimated cost of 583*l.* and 573*l.* respectively, by the Highways Department. Tenders are to be invited for making up Gladstone-road-mews, Lucien-road, Gordondale-road, Crescent-gardens, The Crescent (Section 1), and The Crescent (Section 2). Instructions have been given to the Borough Electrical Engineer to lay electricity supply mains and house services in seven roads in the urban district of Merton, as and when he considers necessary. He has further been instructed to proceed with the laying of mains and other works necessary for giving a supply of electricity to the Maldens and Coombe Urban District, as soon as possible after the Wimbledon Electric Lighting (Extension) Order, 1911, has been confirmed by Parliament, and the loan to meet the cost of the works has been sanctioned by the Local Government Board. The following plans have been passed:—Rev. Canon Scoles, additions to Ursuline Convent, the Downs; Rev. C. P. Fynes Clinton, additions to Cottenham-park Schools, Pepys-road.

OBITUARY.

Mr. W. I. Last.

Mr. William Isaac Last, A.M.Inst.C.E., Science Director of the Victoria and Albert Museum, South Kensington, has just died at his residence in Onslow-crescent, London, S.W. Mr. Last was the eldest son of the late Isaac Glandfield Last, and was born at Dorchester in 1857. He was educated at Owens College, Manchester, and began work as a mechanical engineer in 1873. He became the senior Whitworth scholar in 1878, and was engaged in civil and mechanical work in England and South Africa till 1890, when he was appointed Keeper of the Machinery and Inventions Division of the South Kensington Museum and Senior Keeper in 1900. The deceased was at the time of his death an Associate Member of the Institute of Civil Engineers.

PATENTS.

APPLICATIONS PUBLISHED.*

19,380 of 1910.—Edward John Buckley: Distemper.

22,202 of 1910.—John Thomas Holl, John Holl, Alfred Holl, and James Holl: Cement or compound for cementing leather, wood, and the like, and for other purposes.

22,678 of 1910.—Hagop Agopian: Artesian wells.

24,072 of 1910. Richard Henry Quine: Lavatory basins, bath basins, sinks, baths, and the like.

24,724 of 1910.—Walter Hawkes Cross: Door and gate latches.

26,330 of 1910.—James Alexander Mytton Watson: Folding frame-work especially applicable for ladders, camp furniture, and the like.

678 of 1911.—William Zeebandelaar: Discharge valve mechanism for wash-hand basins, baths, and the like

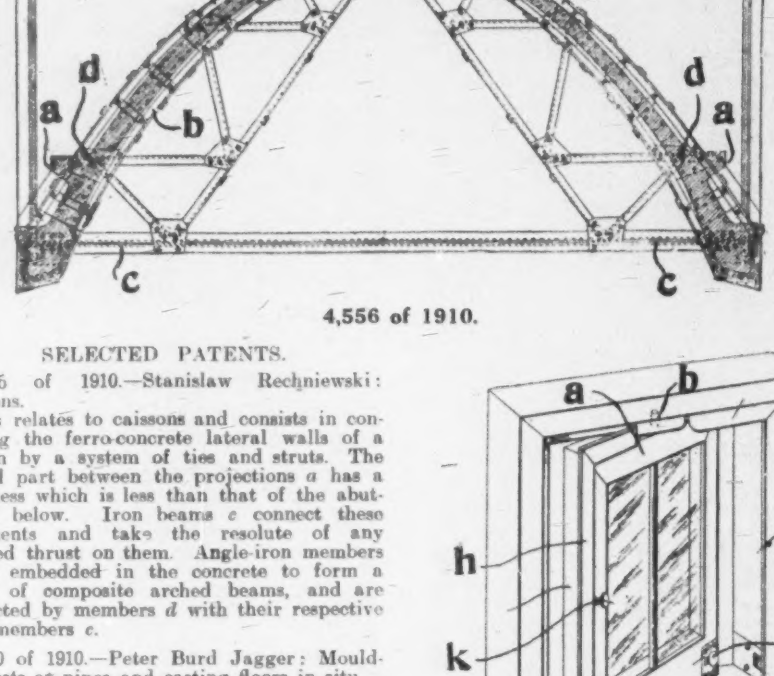
3,755 of 1911.—Theodore McKenna (A. J. Ellis, Incorporated): Hollow metal floors and the like.

5,957 of 1911.—Albert Henry Scherzer: Bascule or lift bridges.

6,113 of 1911.—Richard George Vaughan: Fasteners for windows, doors, boxes, and the like.

9,235 of 1911.—Cecil George McKellar: Water closet basins.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.



4,556 of 1910.

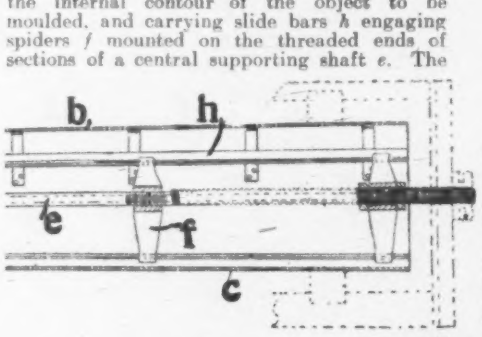
SELECTED PATENTS.

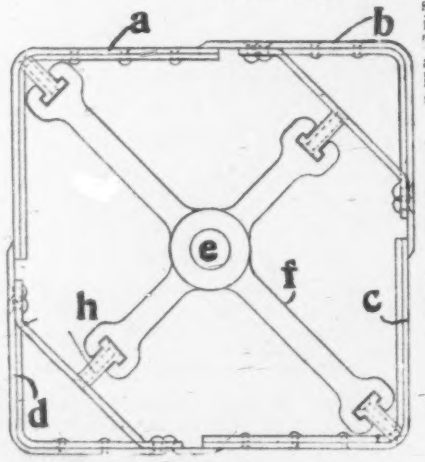
4,556 of 1910.—Stanislaw Rechniewski: Caissons.

This relates to caissons and consists in connecting the ferro-concrete lateral walls of a caisson by a system of ties and struts. The arched part between the projections *a* has a thickness which is less than that of the abutments below. Iron beams *c* connect these abutments and take the resolute of any inclined thrust on them. Angle-iron members *b* are embedded in the concrete to form a series of composite arched beams, and are connected by members *d* with their respective base members *c*.

5,500 of 1910.—Peter Burd Jagger: Moulding posts or pipes and casting floors in situ.

This relates to a collapsible core for use in the manufacture of hollow concrete objects, such as telegraph posts, pipes and hollow floors, and partitions which consists of overlapping sections *a*, *b*, *c*, *d*, corresponding to the internal contour of the object to be moulded, and carrying slide bars *h* engaging spiders *f* mounted on the threaded ends of sections of a central supporting shaft *e*. The



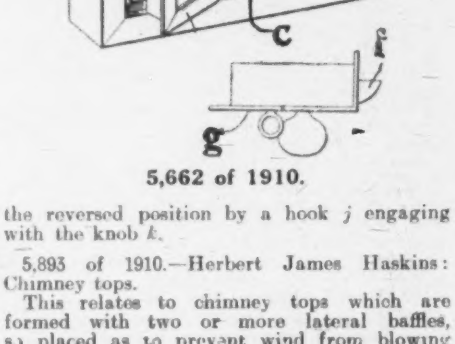


5,500 of 1910.

slide bars *h* are inclined to the shaft *e*, so that an endlong movement of the spider *f* draws the sections together throughout the length of the mould, the inner sections *a*, *c* being drawn inwards at a quicker rate than the outer sections *b*, *d*. In the construction illustrated, the endlong movement is produced by the engagement of a rotatable fixed abutment nut on the screwed end of the shaft *e* with a fixed abutment, such as the projecting sides of the mould box or the end of the core.

5,662 of 1910.—Francis Ernest Gausset Lanagan: Reversible windows.

This relates to reversible windows and consists in the provision of windows *a*, centrally pivoted on vertical pivots *b*, *c*, and fitted with weather strips *h*, and fastened in the closed position by a latch lock *g*, the bevelled portion of the catch *f* being inside, so that the window fastens automatically, and cannot be opened from outside. The window may be held in



5,662 of 1910.

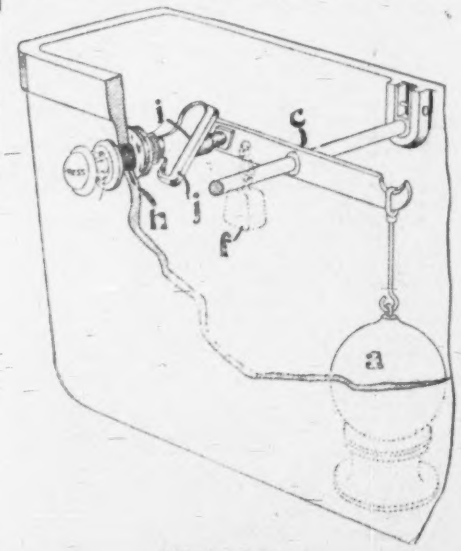
the reversed position by a hook *j* engaging with the knob *k*.

5,893 of 1910.—Herbert James Haskins: Chimney tops.

This relates to chimney tops which are formed with two or more lateral baffles, so placed as to prevent wind from blowing directly into the shaft mouth. The bottoms of the opening incline downward from the shaft mouth, and the lower baffles are also inclined, the upper ones being horizontal. The baffles may be otherwise inclined, but in all cases their planes intersect imaginary lines drawn from the outer ends of the baffles to the opposite side of the shaft mouth.

6,554 of 1910.—Thomas William Twyford: Water-waste preventers.

This relates to a valve in float-valve flushing cisterns, which is operated by an external pusher or slide, the inner end of which acts upon an inclined plane mounted on the valve

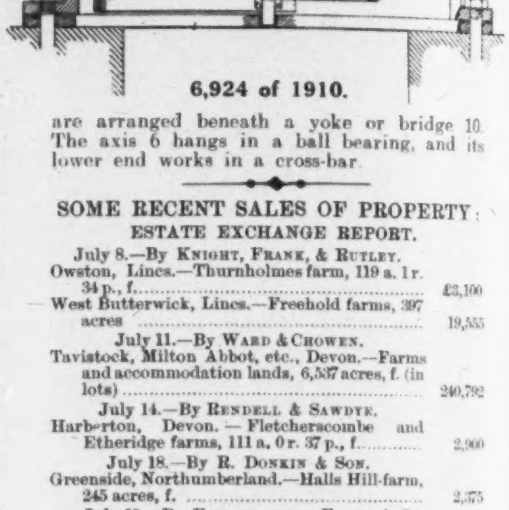


6,554 of 1910.

lever. The float valve *a* is suspended from the lever *c* and counterbalanced by a weight *f*. On the other end of the lever is fixed an inclined portion *j*. The piece *i* acting on this is connected to the push-button, and is held out of operative engagement by a spring arranged in the casing *k*.

6,924 of 1910.—Thomas Archer: Chimney tops.

This relates to chimney tops in which a vane 3 and a half-dome 2 forming the cowl



6,924 of 1910.

are arranged beneath a yoke or bridge 10. The axis 6 hangs in a ball bearing, and its lower end works in a cross-bar.

SOME RECENT SALES OF PROPERTY: ESTATE EXCHANGE REPORT.

July 8.—By KNIGHT, FRANK, & RUTLEY.

Owston, Lincs.—Thurnholmes farm, 119 a. 1 r. 34 p., f.	£3,100
West Butterwick, Lincs.—Freehold farms, 397 acres	19,555

July 11.—By WARD & CHOWEN.

Tavistock, Milton Abbot, etc., Devon.—Farms and accommodation lands, 6,537 acres, f. (in lots)	240,792

July 14.—By RENDELL & SAWDYE.

Harberton, Devon.—Fletcherscombe and Etheridge farms, 111 a. 0 r. 37 p., f.	2,900

July 18.—By R. DONKIN & SON.

Greenside, Northumberland.—Halls Hill-farm, 245 acres, f.	2,575

July 19.—By FAREBROTHER, ELLIS, & Co.

Petersfield, Hants.—Petersfield estate, 263 acres, f. (in lots)	28,465

By EDWARDS, SON, & BIGWOOD.

Lea Marston, Warwick.—Hams Estate, 1,734 acres, f.	51,665

July 20.—By RICHARDSON.

Polebrook, Northants.—Polebrook Lodge Farm, etc., 274 a. 1 r. 37 p., f.	3,820
Oundle, Northants.—Wakerley Lodge Farm, 74 a. 0 r. 20 p., f.	725

July 21.—By J. HANNAFORD & SON.

Chawleigh, Devon.—The Portsmouth Estates, 1,521 acres, f.	26,924

By HOWKINS & SONS.

Floore, Northants.—Pasture and arable land, 125 a. 1 r. 29 p., f.	3,700

July 24.—By KNIGHT, FRANK, & RUTLEY.

Stapleton, Glos.—Outlying portions of Heath House Estate, 654 acres, f.	27,895

July 25.—By A. & H. MAYNARD.

Taunton, Somerset.—Yea Estate, 331 acres, f.	16,670

By CRAWTER.

Cheshunt, Herts.—Bay Tree Farm, 5½ acres, f. and c.	400

By KNIGHT, FRANK, & RUTLEY.

Worminghall, Bucks.—Worminghall and Thomley Estates, 2,030 acres, f.	42,000

July 26.—By KEMSLEY.

Romford, Essex.—61, 63, and 65, Albert-rd., f., w.r. 54l. 12s.	530
Stifford, Essex.—Ten cottages, u.t. 24 yrs., g.r. 7l., w.r. 150l. 16s.	850

By DICKINSON, RIGGALL, & DAVY.

North Cotes, Lincs.—Cottage and grass land, 49 acres, f	2,480
Marshchapel, Lincs.—Close of arable, 5 acres, f.	160

By DILLEY, SON, & READ.

Woodwalton, Hunts.—Elephant and Castle p.h., and 31 a. 1 r. 27 p., f.	760
Upwood, Hunts.—Fen land, 8 a. 2 r. 39 p., f.	255

By ARTHUR SINGLE.

Upton Park.—6 and 8, Waterloo-rd., f., w.r. 46l. 16s.	370

By RUSHWORTH & BROWN.

Surbiton.—1 to 6, St. Leonard's-sq., f., w.r. 98l. 16s.	800
Leytonstone.—Malvern-rd., f.g. rents 6l. 13s., reversion in 83 yrs.	115

By THURGOOD & MARTIN.

Maida-vale.—7, Clifton-rd. (s.), u.t. 69 yrs., g.r. 27l. 12s., y.r. 120l.	1,190

July 27.—By ALEX. H. TURNER & Co.

Wonersh, Surrey.—Upper House-ct. and 112 acres, f.	12,000
Hyde Park.—43, South-st., u.t. 74 yrs., g.r. 100l., p.	7,550
Marylebone.—23, Devonshire-mews East, u.t. 14 yrs., g.r. 15l., y.r. 50l.	280

By STANLEY J. BARNES.

Battersea.—1, Marney-rd., u.t. 74 yrs., g.r. 7l., e.r. 34l.	300

By JOHN H. BULMER.

Rotherhithe.—31 and 33, Irwell-pl., f., w.r 36l. 8s.	140

By CAMERONS.

Willesden.—20, Churchill-rd., u.t. 82 yrs., g.r. 6l., w.r. 49l. 8s.	280

By GLASIER & SONS.

Ifield, Sussex.—Ifield Wood Farm, *etc.*, 14 a. 2 r. 10 p., f.	775

By MARK LIELL & SON.

Bromley.—54, Bruce-rd., u.t. 52 yrs., g.r. 4l. 4s., w.r. 33l. 16s.	150

RECENT SALES—*Continued on page 176.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xvi.; Auction Sales, xxii.

Certain conditions beyond those given in the following information are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

Competitions.

AUGUST 15.—**Berne.**—MONUMENT.—Designs for the erection of a monument at Berne to celebrate the foundation of the International Telegraph Union. Conditions may be seen in the library of the Royal Institute of British Architects.

SEPTEMBER 4. — **Newcastle-on-Tyne.** — The Education Committee invite from architects practising in Newcastle designs for a senior mixed school and a junior mixed school, each to accommodate 365 children. Assessor nominated by R.I.B.A.

SEPTEMBER 9. — **Pontefract.** — SWIMMING-BATHS.—Open to architects of the West Riding of Yorkshire. Particulars from the Borough Surveyor.

SEPTEMBER 12-25.—**Athens.**—COURT OF JUSTICE.—An international competition is instituted by the Ministry of the Interior, for the erection of Court buildings, to cost 160,000*l.* The *Official Gazette* may be seen at the Library of the R.I.B.A.

SEPTEMBER 16. — **Manchester.** — LIBRARY AND ART GALLERIES.—Limited to the ten selected competitors in the first competition. See issue of June 23, p. 780.

* OCTOBER 7. — **Barnsley.** — EXTENSION OF BATHS.—The Barnsley T.C. invite drawings for proposed extension of Public Baths. Three premiums are offered. See advertisement in this issue for further particulars.

OCTOBER 30.—**Holland.**—STAINED GLASS WINDOW.—Designs are invited for a stained glass window to be erected in the University at Groningen. See advertisement in issue of June 9 for further particulars.

OCTOBER 31. — **Marylebone.** — NEW MUNICIPAL BUILDINGS.—Premiums of 100*l.*, 75*l.* 50*l.* The assessor is Mr. Henry T. Hare, F.R.I.B.A. See advertisement in issue of July 14 for further particulars.

NOVEMBER 1. — **City of St. Petersburg.**—MONUMENT TO ALEXANDER II.—Particulars in our issue of August 13, 1910.

DECEMBER 29. — **Glasgow.** — DESIGN FOR A BRIDGE.—Designs are invited (Alexander Thomson Travelling Studentship) for a bridge. Premiums of 60*l.* and 20*l.* are offered. See advertisement in issue of December 24 for further particulars.

JANUARY 31, 1912. — **Australia.** — DESIGNS FOR FEDERAL CAPITAL CITY.—The Government of the Commonwealth of Australia invite competitive designs for the laying out of this Federal capital city. See advertisement in issue of July 7 for further particulars.

JULY 1, 1912.—A plan for the extension of the City of Dusseldorf. Premia of 1,000*l.* to 375*l.* Conditions on application to the Chief Burgomaster, Dusseldorf.

NO DATE.—**Newcastle-on-Tyne.**—A SCHOOL.—Open to architects practising in the city. Particulars at the Education Offices, Northumberland-road.

NO DATE. — **Nottingham.** — BAPTIST CHURCH AND PREMISES.—Limited to Nottingham architects. Particulars from Messrs. Rorke & Jackson solicitors, King-street, Nottingham.

NO DATE.—**Rochdale Infirmary.**—EXTENSIONS.—Assessor, Mr. Alex. Graham, F.R.I.B.A.

NO DATE.—**Salford.**—Extension of office accommodation on workhouse site at Eccles New-road. Premiums 20*l.* and 10*l.* Particulars from the Board of Guardians, Salford. Limited to architects practising in Salford and district only.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

AUGUST 12. — **Capel.** — IMPROVEMENTS, ETC.—For improvements to heating, etc., at the school. Specifications by the Committee's Architect, Mr. Wilfrid H. Robinson, of Caxton House, Westminster, seen at the offices of Mr. W. H. Tompsett, Barham House, Capel, Tonbridge.

AUGUST 12.—**Starbotton.**—ADDITIONS.—Alterations and additions to reading-room at Starbotton. Mr. B. Tennant, Starbotton, Skipton.

AUGUST 12.—**Winchcomb.**—REPAIRS.—For repairs to the Workhouse. Specifications at the Workhouse, Winchcomb.

AUGUST 14.—**Aberdeen.**—STEADING, ETC.—Erection of a new steading on the farm of Nether Kingseat, Newmachar, and two small cottages to accommodate the farm servants. Plans and specifications seen, and quantities from Messrs. D. & J. R. M'Millan, architects, 105, Crown-street, Aberdeen.

AUGUST 14. — **Ashford.**—RAILINGS, ETC.—Erection of iron railings and Bostwick gates at the Council school. Specifications, prepared by the Committee's Architect, Mr. W. H. Robinson, Caxton House, Westminster, with Mr. W. J. Spicer, 19, Bank-street, Ashford, Kent.

AUGUST 14.—**Burton-on-Trent.**—HOLDINGS.—Four Small Holdings, Rosliston. Drawings seen, and quantities, on deposit of 1*l.* 1s., from Mr. Maurice Hunter, A.M.Inst.C.E., Surveyor, Bridge-street, Belper.

AUGUST 14.—**Churwell.**—STABLES.—Erection of new stables in William-street, Churwell. Plans seen, and quantities from Mr. W. Schofield, Secretary, Churwell Industrial Co-operative Society, Ltd.

AUGUST 14. — **Devon.**—HOUSES.—For erection of four houses at Withycombe. Plans and specification with Mr. G. Beavis, architect, 4, Johnson's-place, Exmouth.

AUGUST 14. — **Scotland.** — STEADING, ETC.—For new steading, and alteration of dwelling-house at Greencraig Farm, Letterfourie Estate. Plans and specifications with Mr. W. Hendry, architect, 91, West Church-street, Buckie.

AUGUST 15. — **Langwathby.** — SCHOOLS.—Alterations to schools. Quantities from Mr. J. H. Martindale, F.R.I.B.A., architect, Eaglesfield Abbey Rooms, Castle-street, Carlisle.

AUGUST 15. — **London.** — ALTERATIONS.—For alterations to Stoke Newington Post-office. Drawings, specification, and conditions with Mr. Rutherford, H.M. Office of Works, Carlisle-place, Westminster, S.W. Quantities, on deposit of 1*l.* 1s., from H.M. Office of Works, etc., Storey's-gate, S.W.

AUGUST 15.—**London.**—EXTENSION.—For extension of dining-room at the General Post Office, North, E.C. Drawings, specification, and conditions with Mr. J. Rutherford, H.M. Office of Works, Carlisle-place, Westminster, S.W. Quantities and forms of tender from H.M. Office of Works, etc., Storey's-gate, S.W. Deposit of 1*l.* 1s.

AUGUST 15. — **Nottingham.** — URINALS, ETC.—Erection of latrines, urinals, horse troughs, ablution benches, and cooks' shelter. Quartermaster, South Notts Hussars, Park-row, Nottingham.

* AUGUST 15. — **Orsett.** — INFIRMARY. — The Guardians of the Orsett Union invite tenders for new infirmary. See advertisement in this issue for further particulars.

AUGUST 16. — **Dewsbury.** — CHURCH.—For the restoration of the Woodkirk Church. Plans and specifications seen, and information from Messrs. Hoare & Wheeler, architects, 11a, Orchard-street, Portman-square, London, W. Deposit of 2*l.* 2s. for quantities.

AUGUST 16.—**Saint Cleer.**—ROOT HOUSE, ETC.—Erection of a root house, new roofs, etc., at Lower Treworrick, Saint Cleer. Plans and specification from Mr. R. A. Courtney, Church-street, Liskeard.

AUGUST 17. — **Aldershot.**—BAKEHOUSE, ETC.—For rebuilding bakehouse and alterations to premises, High-street. Plans and specifications seen, and information from Messrs. Friend & Lloyd, architects, Aldershot.

AUGUST 17.—**Droylsden.**—SHOPS, ETC.—Erection of shops, new offices, etc. Deposit of 1*l.* 1s. to John B. Thornley, architect, Market-street, Darwen.

AUGUST 18. — **Aylesbury.** — BUILDING.—Erection of a domestic science building. Plans and specifications with Mr. Fred Taylor, architect, Bourbon-street, Aylesbury.

AUGUST 18.—**Birkby.**—RESIDENCE.—Erection of a villa residence. Plans seen, and quantities from Mr. J. Berry, architect and surveyor, 3, Market-place, Huddersfield.

AUGUST 18. — **Wakefield.** — PARTITIONS.—Erection of partitions at the Otley North-parade Council school. Plans seen, and specifications, with quantities, from the Education Architect, County Hall, Wakefield. Deposit of 1*l.*

AUGUST 19. — **Earlestown.**—HOSPITAL.—Erection of an isolation hospital. Plans seen, and quantities, on deposit of 1*l.* 1s., from Mr. A. Bowes, Surveyor, Town Hall, Earlestown.

AUGUST 21. — **Coventry.** — MORTUARY, ETC.—Erection of a mortuary and extension of the laundry at the Union Workhouse. Particulars from Mr. T. F. Tickner, F.R.I.B.A., High-street-chambers, Coventry.

AUGUST 21.—**Pochriw.**—HOUSES.—Erection of seven dwelling-houses. Plans and specifications with Mr. Joseph Payne, 7, Railway-terrace, Pochriw.

AUGUST 21. — **Treorchy.**—SCHOOL, ETC.—Erection of a Congregational chapel and school. Plans and specification seen, and quantities from Mr. W. Beddoe Rees, architect, 3, Dumfries-place, Cardiff.

AUGUST 22. — **Mansfield.**—POST-OFFICE.—Erection of a new post-office. Drawings, specification, and conditions and contract with the Postmaster, Mansfield. Quantities, on deposit of 1*l.* 1s., from the Secretary, H.M. Office of Works, etc., Storey's-gate, London, S.W.

* AUGUST 23. — **Barnet.** — CLERK'S OFFICES.—The Guardians of the Barnet Union invite tenders for erection of Clerk's offices at Wellhouse-lane. See advertisement in this issue for further particulars.

AUGUST 23.—**Oldham.**—WORKS.—Accommodation for sane epileptics. Plans and specifications and quantities from Mr. T. W. Jenkins, 25, Queen-street, Oldham.

* AUGUST 23.—**Romford.**—SCHOOL.—The Essex Education Committee (Romford District Sub-Committee) invite tenders for new Council school. See advertisement in this issue for further particulars.

AUGUST 24. — **Alcester.** — ALTERATIONS, ETC.—Extensions and alterations to the premises of the Alcester Co-operative Industrial Society. Plans and specifications from Mr. John Johnson, architect, 21, Unicorn-hill, Redditch.

AUGUST 24. — **London.** — CHURCH.—Erection of Methodist church, lecture hall, etc., in Lynwood-road, Upper Tooting, S.W. Plans, specifications, etc., with Mr. A. H. Edwards, Secretary, 11, Foxbourne-road, Upper Tooting, S.W.

* AUGUST 25. — **Birmingham.** — EXTENSION OF PARCEL OFFICE. — The Commissioners of H.M. Works and Public Buildings invite tenders for extension of and alterations to Parcel Office. See advertisement in this issue for further particulars.

* AUGUST 26. — **Brighton.**—GRAMMAR SCHOOL.—The Governors of the Brighton, Hove, and Sussex Grammar School invite tenders for erection of a grammar school at junction of Old Shoreham and Dyke roads, Brighton. See advertisement in this issue for further particulars.

AUGUST 26. — **Eccles.** — HOUSES.—Erection of three houses in Corporation-road, Eccles. Quantities from Mr. Edwin Parkes, Town Clerk, Town Hall, Eccles, on deposit of 2*l.* 2s.

AUGUST 28. — **Aberhill.** — SCHOOL.—For proposed new school, Aberhill, Methil. Quantities and specifications, on deposit of 1*l.* 1s., from Mr. A. Watson Taylor, Clerk to the School Board, Buckhaven.

* AUGUST 30. — **London, S.W.** — STEWARD'S HOUSE.—The Metropolitan Asylums Board invite tenders for a house for the Steward at Western Fever Hospital, Seagrave-road, Fulham, S.W. See advertisement in this issue for further particulars

SEPTEMBER 5. — **Sheffield.**—BUILDINGS.—Erection of buildings in Charlotte-street and Portobello-street. Drawings and specifications seen, and quantities from Messrs. Gibbs, Flockton, & Teather, architects, 15, St. James-row, Sheffield.

SEPTEMBER 6.—**Birmingham.**—HOMES.—Erection of two homes for infants at the Cottage Homes, Marston Green. Quantities, on deposit of 2*l.*, from Messrs. C. Whitwell & Son, architects, 3, Newhall-street, Birmingham.

SEPTEMBER 7. — **Richmond.**—HOME.—Erection of a receiving home for children at Parkshot. Drawings and specifications with the architect, Mr. Edward J. Partridge, F.S.I., M.S.A., of Bank-chambers, Richmond. Quantities on deposit of 5*l.*

SEPTEMBER 9. — **Clacton-on-Sea.**—SLIPWAYS.—Construction of two Jarrah timber lifeboat slipways alongside the pier. Plan and specification with the Engineer and Architect, Mr. W. T. Douglass, M.Inst.C.E., 15, Victoria-street, Westminster, London, S.W. Quantities on deposit of 1*l.*

NO DATE. — **Coventry.**—EXTENSIONS.—For extensions to the Triumph Works, Priory-street. Quantities from architect, Mr. T. R. J. Meakin, M.S.A., 11, Warwick-row, Coventry.

NO DATE.—**Hawick.**—WORKS.—Construction of roof steel works, and boiler seating and chimney stack. Quantities from Mr. Alexander Inglis, architect and surveyor, 12, Bridge-street, Hawick.

NO DATE. — **Leeds.**—ADDITIONS.—For additions to New Wortley Liberal Club. Mr. F. W. Rhodes, M.S.A., architect, Upper Wortley, Leeds.

NO DATE. — **Merioneth.**—ADDITIONS.—Alterations and additions to Cwmtyrmynach Council School. Plans, specification, and particulars from the County Architects, Messrs. Deakin & Howard Jones, M.S.A., Plas Ynys, Borth, S.O.

NO DATE. — **Middlesbrough.**—VILLAS.—Erection of two semi-detached villas in Acklam-lane. Messrs Moore & Archibald, architects, 27, Albert-road, Middlesbrough.

NO DATE.—**Romford.**—SCHOOL.—Erection of a new Council school. Deposit of 2*l.* 2s. to the architect, Mr A. S. R. Loy, 214, Bishopsgate, London, E.C., before August 23.

ENGINEERING, IRON, AND STEEL.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

AUGUST 12.—**Callan, Ireland.**—TANKS.—Erection of two concrete storage water tanks. Plans and specification with Mr. M. J. Lynch, Clerk, Workhouse, Callan.

AUGUST 14. — **Wrexham.** — HEATING.—Reconstruction and improvement of the heating apparatus in the infants' and girls' departments of the Victoria Council School. Plans and specifications seen, and form of tender from Mr. John England, Borough Engineer, Willow Depôt, Wrexham.

AUGUST 21. — **Little Mill.**—RESERVOIR, ETC.—Construction of a reservoir and laying main service pipes at the Reformatory School, Little Mill, Mon. Plan and specification with Messrs. Loughor & Co., Bank-chambers, Pontypool.

AUGUST 24. — **Torquay.** — RESERVOIRS.—For covering four service reservoirs. Drawings seen and specification and quantities, on deposit of 3l. 3s., from Mr. Samuel C. Chapman, M.Inst.C.E., Water Engineer, Town Hall-chambers, Torquay

AUGUST 31. — **Wanstead.**—SEWAGE.—Construction of detritus and septic tanks, engine-house, office and store, storm-water tanks, etc. Plans and specification seen, and quantities from the engineers, Messrs. Willcox, Raikes, & Reed, of 63, Temple-row, Birmingham. Deposit of 5l. 5s.

SEPTEMBER 4. — **Swinton.** — BRIDGES.—Reconstruction of six bridges on the Swinton and Knottingley Joint Railway. Plans seen, and specification and quantities from Mr. H. J. Rudgard, District Engineer, North-Eastern Railway, Scarborough Bridge, York

SEPTEMBER 6. — **Hull.** — BRIDGES, ETC. — The North-Eastern Railway invite tenders for the construction of three bridges and the diversion of the Marfleet drain at Southcoates. Plans seen, and specification and quantities from Mr. C. F. Bengough, the Company's Engineer, York.

SEPTEMBER 13.—**Ellesmere.**—TOWER.—Erection of a ferro-concrete water tower. Plan and conditions from Mr. Isaac Carr, M.Inst.C.E., Farnworth, Widnes.

FURNITURE, PAINTING, MATERIALS, etc.

AUGUST 12. — **Kirkcaldy.** — PAINTING.—For painting girders of the harbour branch railway bridge. Specification from the Burgh Surveyor.

AUGUST 14. — **Braintree.** — PAINTING. — For painting, etc., at the County High School. Specifications with Mr. J. Gleave, Clerk to the Committee, County High School, Braintree.

AUGUST 14.—**Hastings.**—PAINTING.—For painting lodges, chapels, etc., at the Borough Cemetery. Specification from the Borough Engineer, Mr. P. H. Palmer, M.Inst.C.E., Town Hall, Hastings.

AUGUST 15 — **Chelmsford.** — PAINTING.—For painting at the County laboratories. Specification with the County Architect, Mr. F. Whitmore, 73, Duke-street, Chelmsford.

AUGUST 16.—**Newcastle-on-Tyne.**—PAINTING. —For painting the buildings of the Floating Hospital. Specifications from Mr. R. S. Holmes, Caledonian-buildings, 145, Pilgrim-street, Newcastle-on-Tyne.

AUGUST 16.—**Renfrew.**—PAINTING.—For execution of painter work at Dykebar Asylum, near Paisley. Specification and schedule, on deposit of 1l. 1s., from Mr. J. Caldwell, Clerk, County-buildings, Paisley.

AUGUST 17.—**Kent.**—REPAIRS, ETC.—For painting and repairs at the Bethersden Council School. Specifications by the architect, Mr. W.—H. Robinson, Caxton House, Westminster, with Mr. A. R. Cook, Snettisham House, Bethersden, Ashford, Kent.

AUGUST 19. — **Blairgowrie.** — PAINTING.—For painting the steel and ironwork of Caputh Bridge. Specification from Mr. G. Wyllie, Road Surveyor, Blairgowrie, Scotland.

AUGUST 21. — **London.** — PAINTING, ETC.—For painting and decorating at the West Islington Public Library, Thornhill-square, N. Specification and form of tender from the Borough Engineer, Mr. J. Patten Barber, at the Town Hall, Upper-street, N. Deposit of 1l. 1s.

AUGUST 24.—**Hastings.**—PAINTING.—For painting at the Workhouse. Specifications from the architects, Messrs. A. W. Jeffery & Son, 1a, Havelock-road, Hastings.

* AUGUST 24.—**London, E.**—PAINTING AND REPAIRING.—The Stepney Guardians invite tenders for exterior painting and repairing works, at their Workhouse, St. Leonard-street, Bromley-by-Bow, E. See advertisement in this issue for further particulars.

AUGUST 28. — **Barrow-in-Furness.**—PAINTING. —For painting the wood and ironwork at the electricity works. Specification from the Borough Electrical Engineer, Electricity Works.

ROADS, SANITARY AND WATER WORKS.

AUGUST 14. — **Ashton - in - Makerfield.** — SEWERAGE.—Construction of a public sewer. Plans seen, and specification and quantities, on deposit of 10s. 6d., from Mr. T. Burgess, Surveyor, Council Offices, Ashton-in-Makerfield.

AUGUST 14.—**Dundee.**—SEWERAGE.—For laying cast-iron pipe outfall sewer. Plans and specifications seen, and quantities from Mr. Jas. Thomson, City Engineer, 91, Commercial-street, Dundee.

AUGUST 14.—**Shiremoor.**—STREETS.—For street works. Quantities, specifications, and particulars from Mr. J. R. McMillen, Surveyor, Council Offices, Shiremoor, Newcastle-on-Tyne.

AUGUST 14.—**Wrexham.**—SEWER.—For relaying sewer. Plans and specification see, and quantities from Mr. J. England, Borough Engineer, Willow-road, Wrexham.

AUGUST 15. — **Stockton-on-Tees.** — STREETS.—For levelling, paving, and channelling, etc., of streets. Plans and specification from the Surveyor, Mr J. Rodham, Finkle-street, Stockton-on-Tees.

AUGUST 22.—**Neath.**—SEWERAGE.—Construction of stoneware socket pipe sewers. Drawings and specification seen, and quantities, on deposit of 2l. 2s., from Mr. W. E. C. Thomas, A.M.Inst.C.E., Engineer and Surveyor, Orchard-street, Neath.

AUGUST 22.—**Pontllanfraith.**—ROAD.—For construction of the Cwmfelinfach new road. Plans seen, and specification and quantities from the Surveyor, Mr. E. Watkin Edwards, Council Offices, Pontllanfraith, Wales. Deposit of 2l. 2s.

AUGUST 24.—**Luton.**—STREETS.—For private street improvements. Plans and specifications with the Borough Engineer, Town Hall, Luton.

AUGUST 26. — **Burnley.** — SETTS. — Supply of granite setts. Forms of tender from Mr. H. Pritchard, Surveyor, 18, Nicholas-street, Burnley.

AUGUST 31.—**Wantage.**—SEWAGE.—Laying of stoneware and cast-iron outfall sewers, and construction of purification works, and the construction of an approach road. Drawings and specications seen, and quantities from Mr. John William Harris, Engineer and Surveyor, East Challow, Wantage, on deposit of 2l. 2s.

SEPTEMBER 4. — **Bromley.** — MATERIALS. — For supply of road materials. Mr. E. Haslehurst, Clerk, Council Offices, Park House, Bromley, **Kent.**

SEPTEMBER 4. — **Coalville.** — ROAD. — For the making-up of Ashby-road. Plans seen, and specification and quantities from Mr. Leonard L. Baldwin, A.M.Inst.C.E., Surveyor, Municipal Offices, Coalville. Deposit of 1l. 1s.

SEPTEMBER 12.—**Bedford.**—GRANITE.—Supply of about 2,800 tons of broken granite. Particulars from Mr. N. Greenshields, A.M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Bedford.

NO DATE. — **Merioneth.**—DRAINAGE, ETC.—For drainage and other work at the infants' Council school, Dolgelley. Plans, specification, and particulars from the County Architects, Messrs. Deakin & Howard Jones, M.S.A., Plas Ynys, Borth, S.O.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
•DIRECTOR OF GOVERNMENT BUILDING WORKS	Govt. of New South Wales ...	1,000*l.* per annum	Aug. 28
•INSTRUCTOR IN VALUATION TABLES & BOOKKEEPING	The Polytechnic	See advertisement in this issue	No date.
•ASSISTANT CIVIL ENGINEER	Admiralty	200*l.* per annum	No date.

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
•MATERIALS OF NOS. 2 AND 4, PIMLICO-ROAD, ETC.—Sale by tender	White, Berry, & Taylor	Aug. 15
•MTRLS., FITTGS., ETC., OF "QUEEN'S HEAD," PUTNEY BDGE.-RD.—On the Prems.	Horne & Co.	Aug. 17
•FREEHOLD PROPERTY, HANTS—Dolphin Hotel, Southampton	James Harris & Son	Sept. 18

RECENT SALES—*Continued from page 174.*

By C. C. & T. MOORE.

Mile End.—25 and 27, Lockhart-st., u.t. 51 yrs., g.r. 10*l.*, w.r. 72*l.* 16s.	£310
136, 140, and 142, Bow Common-la., u.t. 51 yrs., g.r. 18*l.*, w.r. 130*l.*	545
8, 10, and 12, Portman-pl., f., w.r. 59*l.* 16s.	470
20, Ashcroft-rd., u.t. 32 yrs., g.r. 4*l.*, w.r. 39*l.*	180
32, 34, and 36, Leatherdale-st., u.t. 12¼ yrs., g.r. 3*l.*, w.r. 111*l.* 10s.	230
23, 27, 29, and 31, Carlton-rd., u.t. 14¼ yrs., g.r. 12*l.*, w.r. 144*l.*	325
Limehouse.—6 and 8, Farrance-st., u.t. 35¼ yrs., g.r. 7*l.*, w.r. 80*l.* 12s.	320
Poplar.—34, 36, 37, and 38, Zetland-st., u.t. 54 yrs., g.r. 18*l.*, w.r. 130*l.*	635
1 and 3, Spey-st., u.t. 54 yrs., g.r. 8*l.*, w.r. 65*l.*	315
28 and 30, Sturry-st., f., w.r. 54*l.* 12s.	485
Stratford.—41, Fairland-rd., u.t. 77 yrs., g.r. 2*l.* 16s., w.r. 33*l.* 16s.	235
39, Mathews Park-rd., u.t. 77 yrs., g.r. 3*l.*, w.r. 33*l.* 16s.	170
Hackney.—18 and 19, Speldhurst-rd. and 1 g.r. 20*l.*, u.t. 28 yrs., g.r. 2*l.*, w.r. 70*l.* 8s.	440
Clapton.—62, Blurton-rd., u.t. 62 yrs., g.r. 4*l.* 10s., w.r. 31*l.* 4s.	200
Bow.—16, Lawrence-rd., u.t. 35¼ yrs., g.r. 4*l.* 10s., w.r. 41*l.* 12s.	190
43, Orwell-rd., u.t. 63 yrs., g.r. 4*l.*, w.r. 31*l.* 4s.	115
Kilburn.—157, 159, 161, and 163 Brondesbury-villas, u.t. 84 yrs., g.r. 40*l.*, e.r. 200*l.*	880

By LEWIS & SPAIN.

Brighton.—42, Temple-st., f., p.	450

By STIMSON & SONS.

Edgware-rd.—No. 183(s.), u.t. 9½ yrs., g.r. 6*l.* 6s., y.r. 130*l.*	470
New Cross.—42, Erlanger-rd., u.t. 57 yrs., g.r. 5*l.*, e.r. 42*l.*	420
Haggerston.—66, and 68, Angrave-st., u.t. 27¾ yrs., g.r. 6*l.*, w.r. 68*l.* 18s.	£195
Islington.—57, St. Peters-st., u.t. 34 yrs., g.r. 5*l.*, w.r. 40*l.*	160
Kentish Town.—94, Islip-st., u.t. 38 yrs., g.r. 8*l.* 8s., y.r. 38*l.*	175
Peckham.—29 and 31, St. Marys-rd., u.t. 22 yrs., g.r. 15*l.*, y. and w.r. 88*l.* 12s.	190

By MORRIS, MARSHALL, & POOLE.

Llanidloes, Montgomery.—Glynne and Llanwnog Estates, 3,390 acres, f.	35,618

By J. KITTOW & SON.

Tintagel, Cornwall.—Wharncliffe Estate, 2,200 acres, f.	48,212

July 28.—By PERCY W. CLEAVE.

Leyton.—10, 12, and 14, Stewart-rd., f., w.r. 85*l.* 16s.	575
Chelsea.—13, Gunter-gr., u.t. 43 yrs., g.r. 5*l.*, e.r. 50*l.*	310
Willesden.—1 to 9 (odd), Oldfield-rd., u.t. 88 yrs., g.r. 27*l.* 10s., w.r. 169*l.*	570
11 to 17 (odd), Oldfield-rd., u.t. 88 yrs., g.r. 22*l.*, w.r. 135*l.* 4s.	470
East Ham.—17, 19, 21, and 23, Colston-rd., u.t. 84 yrs., g.r. 16*l.* 16s., w.r. 114*l.* 8s.	445
Sydenham.—1 and 2, King Edward's-par., u.t. 90 yrs., g.r. 22*l.* 10s., e. and y.r. 90*l.*	255

By FOSTER & CRANFIELD.

Stoke Newington.—Drayton-pk., f.g. rents 14*l.*, reversion in 65 yrs.	315
Gillespie-rd, f.g.r. 10*l.*, reversion in 66 yrs.	230
Wandsworth Common.—Bolingbroke-gr., f.g.r. 8*l.* 10s., reversion in 66 yrs.	180

By W. B. HALLETT.

Barnsbury.—5, Ellington-st., f., y.r. 40*l.*	420
Holloway.—40, Hollingsworth-st., u.t. 32 yrs., g.r. 7*l.*, y.r. 52*l.*	150

By HUSSEY, WALCOTT, & Co.

Bayswater.—16, Chepstow-pl., f., y.r. 60*l.*	£770
67, Westbourne Park-rd., u.t. 38 yrs., g.r. 12*l.*, y.r. 60*l.*	300
4 and 34, Alexander-st., u.t. 38 yrs., g.r. 18*l.*, y.r. 100*l.*	565
3, Durham-ter., u.t. 38 yrs., g.r. 10*l.*, p.	200

By WRIFORD, DIXON, & WINDER.

Finchley.—12, 13, and 14, Salisbury-ter., f., w.r. 78*l.*	820
Long-la., Penrith, and plot of land, f., y.r. 36*l.*	615
Eversleigh-rd., two plots of land, f.	172

By RENDELL & SAWDYE.

Buckfastleigh East, Devon.—Forder and Scorriton Farms, 208 a. 3 r. 16 p., f.	2,770

By ARTHUR RUTTER, SONS, & Co.

Bury St. Edmund's, Suffolk.—32, Horringer-rd., f.	390
110, Fornham-rd., f.	365

By HUNT & PEDDAR.

Botesdale, Suffolk.—Abbot's Hall Farm, 163 acres, f.	2,000

By J. HANNAFORD & SON.

Chulmleigh, Devon.—Agricultural estate, 508 acres, f.	7,437

July 29.—By SALTER, SIMPSON, & SONS.

Burnham Deepdale, Norfolk.—Burnham Deepdale and Sussex Farms, 2,016 acres, f.	21,650

By H. W. & C. SPELMAN.

Kirby Cane, Norfolk.—Letchmere Farm, 138 a. 1 r., f.	1,650
Thorpe-next-Norwich, Norfolk.—6 and 7, Brooklyn-ter., f.	250

By JOSEPH E. WALTER.

Navenby, Lincs.—Agricultural estate, 876 acres, f.	£14,000
By DILLEY, SON, & READ.	
Duxford, Cambs.—Arable land, 9 a. 3 r. 23 p.,	350
July 31.—By DANN & LUCAS.	
Newington, Kent.—Four fields, 34 a. 0 r. 10 p., f.	1,700
Crundale, Kent.—Trimworth Manor Farm, 301 a. 2 r. 8 p., f.	3,500
Thornham-field, 24 a. 0 r. 32 p., f.	300
By FIELD, SONS, & GLASIER.	
Mitcham.—1 to 10, Sarahs-pl., f., w.r. 137l. 10s.	620
By WM. HOUGHTON.	
Walthamstow.—8, Shrubland-rd., u.t. 88 yrs., g.r. 3l. 5s., p.	185
31 and 33, Gosport-rd. (s.), u.t. 67 yrs., g.r. 10l., y. and e.r. 52l.	135
By MELROSE & RUSSELL.	
Notting Hill.—Norland-rd., f.g. rents 24l., reversion in 31 yrs.	605
Princes-rd., f.g. rents 15l. 10s., reversion in 32 yrs.	355
Bethnal Green.—Norton-st., f.g.r. 16l., reversion in 17 yrs.	395
By REYNOLDS & EASON.	
Stamford Hill.—128 and 134, Olinda-rd., u.t. 68 yrs., g.r. 10l., w.r. 57l. 4s.	115
By GEORGE LOVEITT & SONS.	
Leamington Hastings, Warwick.—Freehold farm, 157 acres	1,900
By HENRY MANLEY & SONS.	
Nantwich, Cheshire.—Marshfield Bank Farm, 94 acres, f.	5,825
August 1.—BROAD, WILTSHIRE, & PENNY.	
Fulham, Kelvedon-road, f.g. rents 25l. 4s., reversion in 83 yrs.	525
By HUNTER & HUNTER.	
Dulwich.—50, Dulwich-road, u.t. 37 yrs., g.r. 10l. 10s., y.r. 44l.	150
By S. WALKER & SON.	
Wandsworth Common.—279, Trinity-road, u.t. 86 yrs., g.r. 11l. 11s., e.r. 53l.	500
By FLEURET, ADAMS, & HAXELL.	
Hackney.—Mare-street, Railway Tavern, lease for 48 yrs. at 100l., with goodwill and possession	15,000
August 2.—By JONES, SON, & DAY.	
East Ham.—Barking-rd., Katherine Stores, lease for 28 yrs., at 60l., with goodwill and possession	2,250
Walthamstow.—765, Lea Bridge-rd., f., p.	425
St. Georges East.—68, Red Lion-st., f., p.	115
By G. PEARCE & SONS.	
Clerkenwell.—Pine st., l.g. rents 34l., u.t. 22 yrs., g.r. 4l.	240
August 3.—By BUCKLAND & SONS.	
Cobham, Surrey.—Fairmile-av., Greyhouse, f., p.	1,200
By C. H. BROWN.	
Pimlico.—22, Westmoreland-st., u.t. 22½ yrs., g.r. 8l., e.r. 50l.	180

Contractions used in these lists.—**F.g.r.** for freehold ground-rent; **l.g.r.** for leasehold ground-rent; **i.g.r.** for improved ground-rent; **g.r.** for ground-rent; **r.** for rent; **f.** for freehold; **c.** for copyhold; **l.** for leasehold; **p.** for possession; **e.r.** for estimated rental; **w.r.** for weekly rental; **q.r.** for quarterly rental; **y.r.** for yearly rental; **u.t.** for unexpired term; **p.a.** for per annum; **yrs.** for years; **la.** for lane; **st.** for street; **rd.** for road; **sq.** for square; **pl.** for place; **ter.** for terrace; **cres.** for crescent; **av.** for avenue; **gdns.** for gardens; **yd.** for yard; **gr.** for grove; **b.h.** for beerhouse; **p.h.** for public-house; **o.** for offices; **s.** for shops; **ct.** for court.

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PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Per 1000 Alongside, in River.

	£ s. d.
Best Stocks	1 13 0
Picked Stocks for Facings	2 7 0

Per 1000, Delivered at Railway Depôt.

	£ s. d.		£ s. d.
Flettons	1 9 0	Double Headers	13 7 6
Best Fareham Red	3 12 0	One Side and two Ends	17 7 6
Best Red Pressed Ruabon Facing	5 0 0	Two Sides and one End	18 7 6
Best Blue Pressed Staffordshire	3 15 0	Splays & Squints	15 17 6
Do. Bullnose	4 0 0	Best Dipped Salt Glzd. Str'tch'rs	10 17 6
Best Stourbridge Fire Bricks	3 14 0	Headers	10 7 6
GLAZED BRICKS. Best White and Ivory Glazed Stretchers	10 17 6	Quoins, Bullnose, and Flats	14 7 6
Headers	10 7 6	D'ble Stretchers	16 7 6
Quoins, Bullnose, and Flats	14 7 6	Double Headers	13 7 6
D'ble Stretchers	16 7 6	One Side and two Ends	17 7 6
Second Quality White and Dipped Salt Glazed, £1 5s. per 1000 less than best.		Two Sides and one End	18 7 6
		Splays & Squints	15 17 6

BRICKS, &c. (*Continued*).

	s. d.	
Thames and Pit Sand	6 9	per yard, delivered.
Thames Ballast	5 3	" "
Best Portland Cement	29 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly dpt.	

STONE.

Per Ft. Cube.

	s. d.
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1
White Basebed, delivered on road waggons Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½

Per Ft. Cube, delivered at Railway Depôt.

	s. d.		s. d.
Ancaster in blocks..	1 10	Closeburn Red Freestone	2 0
Beer in blocks	1 6		
Greenshill in blocks	1 10	Red Mansfield Freestone	2 4
Darley Dale in blocks	2 4	Talacre & Gwespyr Stone	2 8
Red Corsehill in blocks	2 3		

YORK STONE—*Robin Hood Quality.*

Per Ft. Cube, Delivered at Railway Depôt.	s. d.
Scappled random blocks	2 10
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3
6 in. rubbed two sides ditto, ditto	2 6
3 in. sawn two sides slabs (random sizes)	0 11½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½
1½ in. to 2 in. ditto, ditto	0 6

HARD YORK—

Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	3 0
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landing to sizes (under 40 ft. super.)	2 8
6 in. rubbed two sides ditto	3 0
3 in. sawn two sides slabs (random sizes)	1 2
2 in. self-faced random flags	0 5

SLATES.

Per 1000 of 1200 at Railway Depôt.

In. In.	£ s. d.	In. In.	£ s. d.
20×10 best blue Bangor	13 2 6	20×10 best Eur'ka unfading green	15 17 6
20×12 ditto	13 17 6	20×12 ditto	18 7 6
20×10 1st quality ditto	13 0 0	18×10 ditto	13 5 0
20×12 ditto	13 15 0	16×8 ditto	10 5 0
16×8 ditto	7 5 0	20×10 permanent green	11 12 6
22×10 best blue Portmadoc	12 12 6	18×10 ditto	9 12 6
16×8 ditto	6 12 6	16×8 ditto	6 12 6

TILES.

At Railway Depôt.

	s. d.		s. d.
Best plain red roofing (per 1000)	42 0	Do. Ornamental (per 1000)	52 6
Hip and Valley (per doz.)	3 7	Hip and Valley (per doz.)	4 0
Best Broseley (per 1000)	50 0	Best Ruabon red, brown, or brindled (Edw'ds) (per 1000)	57 6
Do. Ornamental (per 1000)	60 0	Do. Ornamental (per 1000)	50 0
Hip (per doz.)	4 0	Hip (per doz.)	4 0
Valley (per doz.)	3 0	Valley (per doz.)	3 6
Best "Hartshill" brand, plain sand-faced (per 1000)	50 0	Staffords. (Hanley) Reds or Brindled (per 1000)	42 6
Do. pressed (per 1000)	47 6	Hand-made sand-faced (per 1000)	45 0
		Hip (per doz.)	4 0
		Valley (per doz.)	3 6

WOOD.

BUILDING WOOD. At per standard.

	£ s. d.		£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 0 0	...	15 10 0
Deals: best 3 by 9	13 10 0	...	14 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	...	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0		less than 7 in. and 8 in.
Deals: seconds	1 0 0		less thn best.
Battens: seconds	0 10 0	"	"
2 in. by in. and 2 in. by 6 in.	9 10 0	...	10 10 0
2 in. by 4½ in. and 2 in. by 5 in.	9 0 0	...	10 0 0
Foreign Sawn Boards—			
1 in. and 1¼ in. by 7 in.	0 10 0		more than battens.
¼ in.	1 0 0		"
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 5 0 0	...	5 10 0
Seconds	4 10 0	...	5 0 0
Small timber (8 in. to 10 in.)	3 17 6	...	4 0 0
Small timber (6 in. to 8 in.)	3 5 0	...	3 10 0
Swedish balks	2 12 6	...	3 0 0
Pitch-pine timber (30 ft. average)	4 10 0	...	5 5 0

JOINERS' WOOD. At per standard.

	£ s. d.		£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 10 0	...	25 10 0
3 in. by 9 in.	22 10 0	...	23 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	...	18 0 0
Second yellow deals, 3in. by 11 in.	19 0 0	...	20 0 0
" " 3 in. by 9 in.	18 0 0	...	19 10 0
Battens, 2½ in. and 3in. by 7 in.	14 0 0	...	15 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 0 0	...	15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	...	12 10 0

WOOD (*Continued*).

JOINERS' WOOD (*Continued*)— At per standard.

	£ s. d.		£ s. d.
Petersburg: first yellow deals, 3 in. by 11 in.	21 10 0	...	22 10 0
Do. 3 in. by 9 in.	18 10 0	...	19 10 0
Battens	14 0 0	...	15 0 0
Second yellow deals, 3 in. by 11 in	16 10 0	...	17 10 0
Do. 3 in. by 9 in.	15 0 0	...	16 0 0
Battens	11 10 0	...	12 10 0
Third yellow deals, 3in. by 11 in.	13 10 0	...	14 10 0
Do. 3 in. by 9 in.	13 0 0	...	14 0 0
Battens	10 10 0	...	11 0 0
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	15 0 0	...	16 0 0
" " 3 in. by 9 in.	14 0 0	...	14 10 0
Battens	11 10 0	...	12 10 0
Second white deals, 3in. by 11in.	14 0 0	...	15 0 0
" " 3 in. by 9 in.	13 0 0	...	14 0 0
Battens	10 10 0	...	11 0 0
Pitch-pine: deals	19 0 0	...	21 0 0
Under 2 in. thick extra	0 10 0	...	1 0 0
Yellow Pine—First, regular sizes	44 0 0		upwards.
Oddments	32 0 0		"
Seconds, regular sizes	33 0 0		"
Oddments	28 0 0		"
Kurai Pine—Planks per ft. cube.	0 3 6	...	0 5 0
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	...	0 3 9
Small " "	0 2 6	...	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 6	...	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	...	0 0 9½
¼ in. do. do.	0 0 7	...	—
Dry Mahogany—Houndras, Tabasco, per ft. super. as inch..	0 0 10	...	0 1 1
Selected, Figury, per ft. super. as inch	0 1 6	...	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	...	0 1 0
Teak, per load	18 0 0	...	22 0 0
American Whitewood planks, per ft. cube	0 4 0	...	0 5 0
Prepared Flooring, etc.—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. " "	0 14 0	...	0 18 6
¾ in. by 7 in. white "	0 10 0	...	0 11 0
1 in. by 7 in. " "	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	...	7 10 0
Compound Girders, ordinary sections	9 0 0	...	10 0 0
Steel Compound Stanchions	11 0 0	...	12 0 0
Angles, Tees, and Channels, ordinary sections	9 0 0	...	10 0 0
Flitch Plates	9 0 0	...	9 10 0
Cast Iron Columns & Stanchions, including ordinary patterns	7 10 0	...	8 10 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 10 0	...	9 0 0
Staffordshire Crown Bars, good merchant quality	8 15 0	...	9 5 0
Staffordshire "Marked Bars"	10 10 0	...	—
Mild Steel Bars	8 15 0	...	9 5 0
Hoop Iron, basis price	9 5 0	...	9 10 0
" " Galvanised	17 0 0	...	—

(*And upwards, according to size and gauge.)

Sheet Iron Black—			
Ordinary sizes to 20 g.	9 15 0	...	—
" " 24 g.	10 15 0	...	—
" " 26 g.	12 5 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	15 10 0	...	—
" " 26 g.	16 10 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	18 0 0	...	—
" " 22 g. and 24 g.	18 10 0	...	—
" " 26 g.	20 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes, 6ft. to 8ft. 20 g.	14 10 0	...	—
" " 22 g. and 24 g.	14 15 0	...	—
" " 26 g.	16 5 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	12 0 0	...	—
Best Soft Steel Sheets, 2 g. & 24 g.	13 0 0	...	—
" " " 26 g.	15 0 0	...	—
Cut Nails, 3 in. to 6 in.	10 10 0	...	11 0 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	£ s. d.		£ s. d.
LEAD—Sheet, English, 4lb. and up	17 5 0	...	—
Pipe in coils	17 15 0	...	—
Soil pipe	20 15 0	...	—
Compo pipe	20 15 0	...	—
ZINC—Sheet—	In casks of 10 cwt.		
Vielle Montagne	32 5 0	...	—
Silesian	31 15 0	...	—
Zinc, in bundles, 1s. per cwt. extra.			
COPPER—			
Strong Sheet per lb.	0 1 0	...	—
Thin " "	0 1 1	...	—
Copper nails "	0 0 10	...	—
Copper wire "	0 0 10	...	—
BRASS—			
Strong Sheet "	0 0 11	...	—
Thin "	0 1 0	...	—
TIN—English Ingots "	0 1 11	...	—
SOLDER—Plumbers' "	0 0 8½	...	—
Tinmen's "	0 0 11	...	—
Blowpipe "	0 1 2	...	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

15 oz. thirds	2½d.	26 oz. fourths	3½d.
" fourths	1½d.	32 oz. thirds	5½d.
21 oz. thirds	3½d.	" fourths	4½d.
" " fourths	2½d.	Fluted Sheet, 15 oz.	3½d.
23 oz. thirds	4½d.	" 21 oz.	4½d.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

⅛ Hartley's	2d.	Figured Rolled, Oxford Rolled, Oceanic, Arctic, Muffled, and Rolled Cathedral, white	3½d.
¼ "	2½d.		
⅜ "	2½d.	Ditto, tinted	5d.

* Not less than three crates.

OILS, &c.		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	3	7
" " " in barrels	"	0	3	8
" " " in drums	"	0	3	10
Boiled " in barrels	"	0	3	10
" " " in drums	"	0	4	1
Turpentine in barrels	"	0	3	3
" in drums	"	0	3	5
Genuine Ground English White Lead,	per ton	21	10	0
Red Lead, Dry	"	20	0	0
Best Linseed Oil Putty	per cwt.	0	11	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	6
Fine Elastic Carriage	0	12	0
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	10	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flating Varnish	0	18	0
White Pale Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	0
Berlin Black	0	16	0
Knotting	0	10	9
French and Brush Polish	0	10	6

TO CORRESPONDENTS.

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N.B.—Illustrations of the First Premiated Design in any important architectural competition will always be accepted for publication by the Editor, whether they have been formally asked for or not.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 a.m. *on Thursday.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.* unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ASLACTON (Norfolk).—For alterations and improvements at Aslacton School:—
E. J. Smith, Bunwell* £295

BRIDGTOWN.—For erection of elementary school with outbuildings. Messrs. Bailey & McConnal, architects, Bridge-street, Walsall:—

C. Horton	£2,870 0	W. Kendrick	£2,525 0
J. Smith	2,825 0	Gough & Son	2,490 0
A. Davies	2,685 10	W. Roe	2,468 0
J. Reynolds	2,647 0	Mr. Dorse	2,444 0
F. Epsley	2,647 0	Guest & Son	2,419 0
J. & F. Wooton	2,588 17	S. Wooton	2,397 0
M. Round	2,575 0	Speake & Son	2,389 0
W. Wistance	2,555 0		

DORCHESTER.—For erection of a bridge over the River Hooke. Mr. F. T. Maltby, engineer, South-street, Dorchester:—

W. T. Cooper	£178	E. Legg	£105
A. E. Pichett	125	J. Legg, Gt. Toller, Dorchester*	98
A. Harvey	124		

HALIFAX.—For erection of a house and open cart shed at Stainland, for Mr. Thos. Brown. Mr. L. Coates, A.R.I.B.A., architect, 10, Central-street, Halifax:—
Masons: W. H. & B. Priestley, Stainland near Halifax*
Joiners: W. Ratcliffe & Sons, Claremont, Halifax*
Plumber and Glazier: J. H. Spencer, Stainland*
Slaters, Plasterers, and Painters: S. Collins & Sons, Stainland* } £378 15 6

IPSWICH.—For painting at the mental hospital. Mr. E. Buckham, Borough Surveyor, Town Hall, Ipswich:—

G. Kenney	£135 0 0	A. Stearn & Son	£74 9 0
W. G. Fisk & Co.	79 18 6	Crisp & Smith	72 10 0
A. C. Harding	74 17 0	C. A. Green*	63 15 0

[All of Ipswich.]

JERSEY.—For construction of a parish hall. Mr. C. G. Bowles, M.S.A., architect, Halkett-place:—

J. R. Malzard	£2,498	C. J. Le Quesne*	£2,235
A. F. Le Moltee	2,399		

SELBY.—For construction of eight cottages at the depot. Mr. Bruce Gray, Borough Engineer:—

T. Reed	£1,500 0 0	J. H. Carr	£1,360 0 0
T. Foster	1,455 11 0	Lister, Brooke, & Co., Brighouse*	1,355 0 0
H. Foster	1,389 15 10		
J. Kay	1,364 16 0		

SMALLBURGH.—For erection of six cottages in Horning and six in Happisburgh, for the Smallburgh Rural District Council:—
Sparkes & Latten, 151, College-road, Norwich* ‡ £1,530
‡ For twelve cottages.

TIBENHAM.—For proposed enlargement of school:—
Tash & Langley, King's Lynn £542 15

TIVERTON.—For widening bridge over the River Lowman. Mr. J. Siddalls, Borough Surveyor, Tiverton:—
G. Pollard & Co. £430 0
Fothergill Bros., Exeter* 386 10

WAKEFIELD.—For pointing the tower of the Town Hall. Mr. J. P. Wakeford, City Surveyor, Town Hall, Wakefield:—
W. Thickett, Osset, Yorks. £80

WELLINGBOROUGH.—For the erection of council infants' school, Wellingborough. Messrs. Talbot Brown & Fisher, architects, Wellingborough:—

W. Stevens	£3,139 10	E. J. Fisher	£2,864 0
H. Martin, Ltd.	3,080 0	T. Hickman & Son	2,864 0
W. Packwood	2,999 0	S. Brown & Son, Ltd.	2,847 0
Hackaley Bros.	2,947 0	O. P. Drever	2,831 0
C. Andrews	2,875 0	R. Marriott, Rushden*	2,820 0
W. Goodman	2,865 0		

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